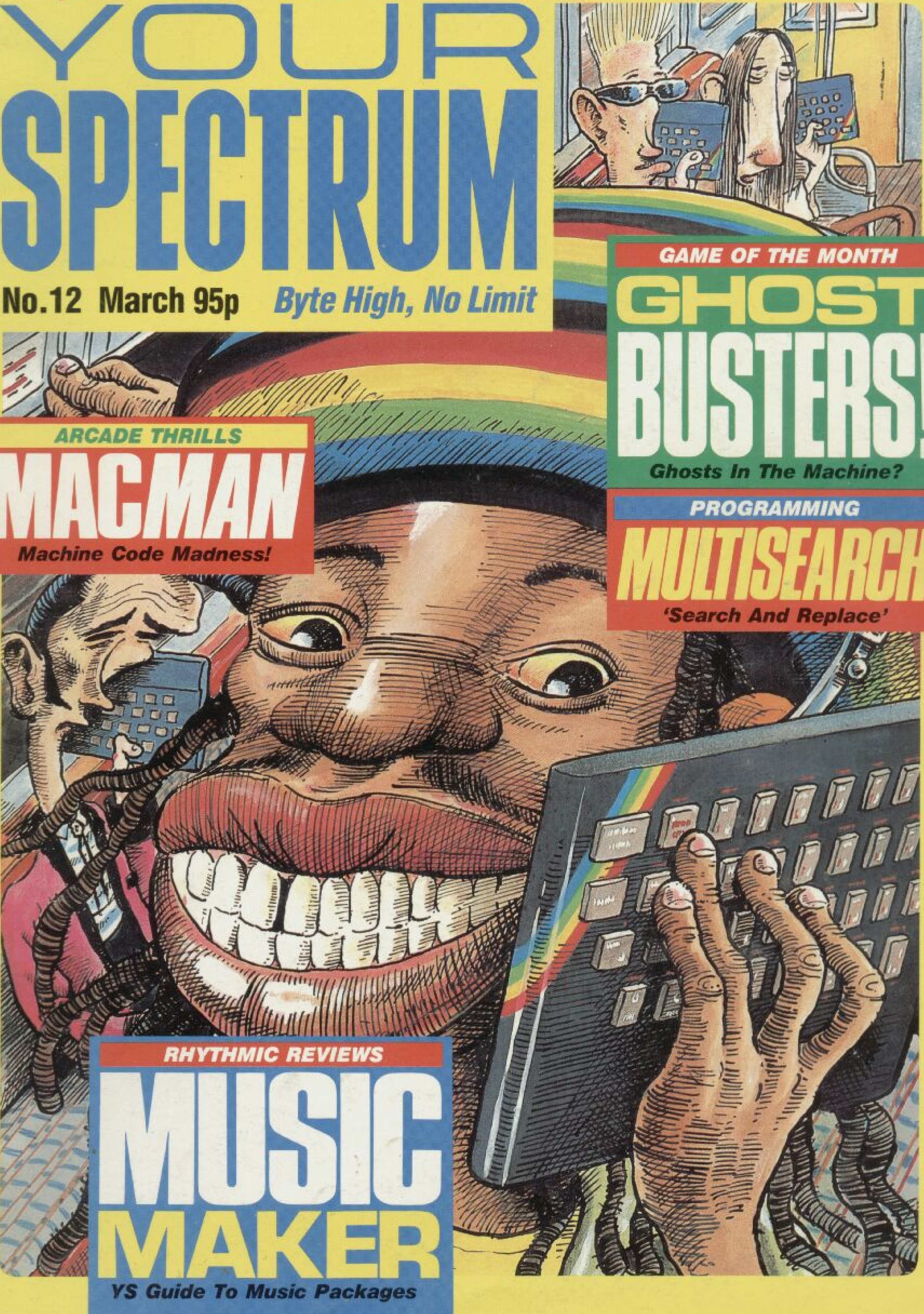
£1,000 PRIZES TO BE WON ON PAGE 57!

YOUR SPECTRUM

No.12 March 95p *Byte High, No Limit*



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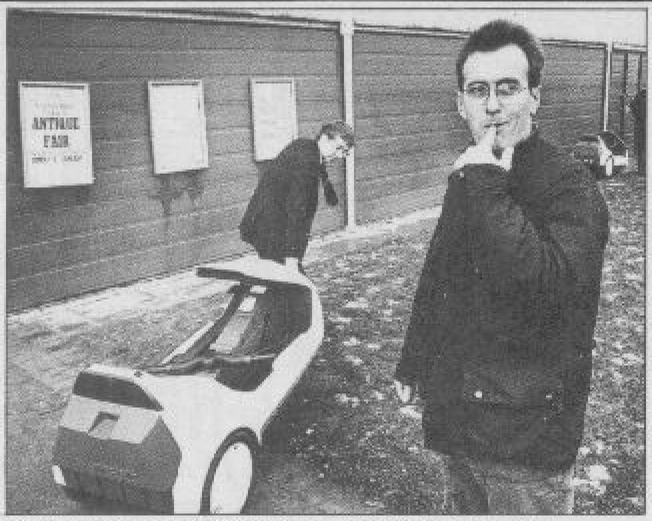
You're now entering Frontlines country — turn those pages for news of the rumoured Spectrum upgrade, the Cheetah compo winners and much more!

FRONTLINES

OUT TO LAUNCH!

If you're bored with software that repeatedly crashes through loading errors, never fear — Sir Clive has now introduced hardware that can be crashed!

The Sinclair C5 is claimed to be "a new power in personal transport" and the "vehicle of the future". Its actual constituent parts are a 'squirrel-cage' electric motor (the basic design of which originated in the late nineteenth century and has been used in washing machines ever since!), a lead-acid battery (of similarly venerable antecedents), a welded pressed-steel frame (not conceptually unadjacent to that employed in any early '50s NSU motorcycle) and, oh yes, bodywork that profiles as the largest polypropolene injection moulding ever mass-produced.



Roger Willis meets the C5 — "Honest guv, the rubber band came off in my hands!"

The Sinclair C5 will retail at only £399, which is the same price as the Sinclair QL, but waiting for the emergence of an 'infinite lives' POKE may well be worthwhile before considering purchase. Expert criticisms of its safety and stability abound; at its launch, motorcycle stunt rider and leading road safety campaigner Dave Taylor was impolitely requested to desist from demonstrating the C5's tendency to climb on to two wheels instead of its usual three (before falling over completely!).

Fourteen years may be old enough to drive a Sinclair C5 on the main roads without suitable safety measures (such as helmet, safety belt and so on) . . . but it could also be old enough to die in one!

THE SOUND OF MUSIC

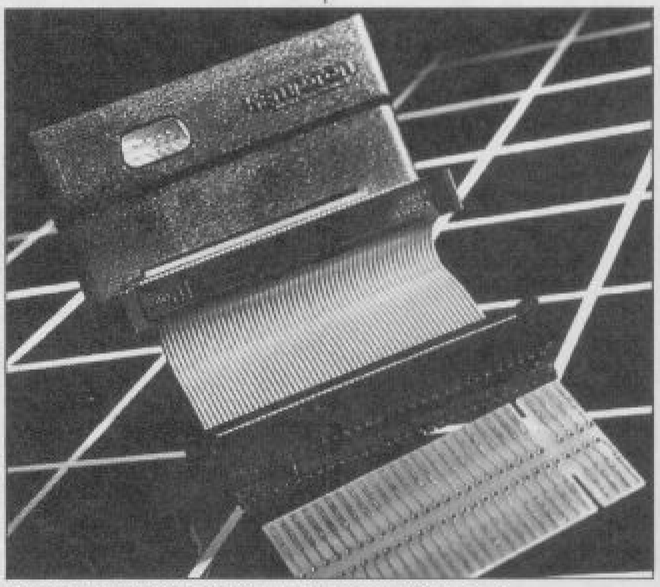


The Speccy barks back! (Bach's back?)

Have you ever wanted to play Bach's *Fugue in D minor* to the merry sound of a dog barking? Well, now you can do it — with Datel's clever add-on, the Digital Sound Sampler.

Although slightly larger versions of the device have been around the music industry for many years, it's now been adapted to work on the Speccy system. The Digital Sound Sampler allows you to record a noise — any noise — and then play back the digital recording in any way you wish ... either as it was recorded or backwards, at a different pitch, expanded. In fact, you can do almost anything!

With a price tag of £49.99 it's not too far out of the range of your average Spectrum user. If you can't wait for a full review in *Your Spectrum*, then give Datel a ring on (0782) 273815.


Good news for all Kempston joystick and Centronics interface owners. The trouble used to be that if you had a replacement keyboard, there wasn't enough clearance to plug in the joystick itself. So, the company has produced this flexible extender cable at £7.95 which moves the interface away from the back of the keyboard. Give Kempston a buzz on (0234) 852997.

THE POWER OF CASH

Well, it had to happen. The music and micro industries are far too close together for the two tribes not to mix with each other. And so, following negotiations between Ocean and Island Records, Liverpool hit band *Frankie Goes To Hollywood* will get its very own computer game.

Ocean can be contacted on 061-832 6633 for the Frankie fans out there.

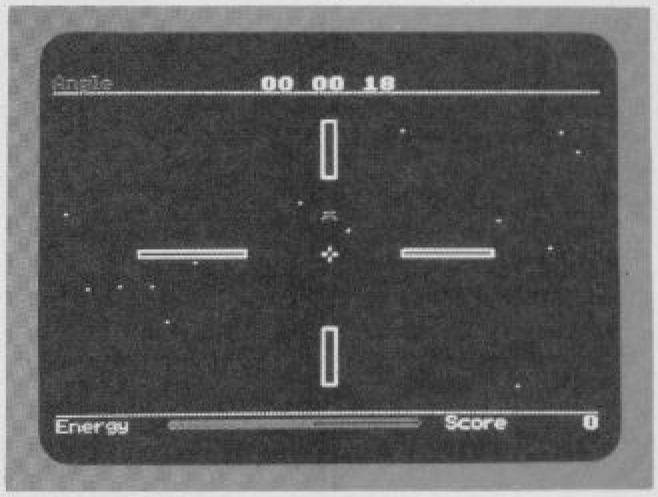

Relax . . . Frankie's gone to Ocean.

DO YOU WANT TO KNOW A SECRET?

Purchasers of Design Designs' program *Dark Star* are getting a bonus in the shape of an extra game on the tape called *Spectacle.* Comprising some 40K of code, the company aren't letting users run the program, as a password must be typed in before it will start.

The encryption method used is a fairly standard one whereby the text of the password entered is used to modify the code before it's run. This means that the password doesn't have to be stored within the code.

Bearing in mind that the password is about 26 characters in length, there could be a lot of worn out tape decks around if Design Design don't come up with the goods fairly soon.



***Dark Star*'s dark secret . . .**

QUICKSILVA'S MOLE

Author of smash software hits like *Monty Mole* and *Potty Pigeon,* Tony Crowther, has signed up with Quicksilva to produce two games for 1985.

Tony's not actually leaving his company, Wizard Developments, but he and his partner Roger Taylor are passing on distribution rights to QS for their next two earth-shattering games. Unfortunately, their first game is being written for the Commie 64, but if you keep everything crossed the next one's bound to be something for the Speccy.

If you're into amazing graphics and you want Tony Crowther and Roger Taylor writing for *your* Spectrum, give QS a ring on (0703) 26515 and tell 'em.

Meanwhile, it's a warm cheerio to original QS members Caroline Hayon and Mark Eyles — they've decided to move on to pastures new. Let's just hope that the new-styled Quicksilva is as good as the old!



Wizard Developments at Quicksilva?

PRINTING IN THE PINK



Floyd 40 — listing to 32 or 40 columns.

A new Dublin-based company called Floyd has recently launched their first ever product for the Spectrum; an intelligent, Alphacom-type, thermal printer.

Called the Floyd 40 and priced at £79.95, it's obviously going to be a direct competitor to the established Alphacom 32.

The difference between the Floyd 40 and Alphacom 32 are numerous. Though the Floyd 40 can cope with all the usual stuff like screen copy and software on ROM, it also offers intelligence with three different print modes including Graphics, Adjust and List. It can also print double height, double width and inverted.

On top of all these apparently thrilling features it can also list at either 32 or 40 columns.

For more information, drop Floyd a line at 153 Merrion Road, Dublin 4, Ireland.

HACKING AWAY



All the POKEs and more! Send your hacking hints to Andrew Pennell, Hacking Away, Your Spectrum, 14 Rathbone Place, London W1P 1DE.

Welcome to this month's hacking column — and have we got some strange POKEs for you! I'll start off with *Mr Wimpy* from Ocean. **Peter Ball** wrote in with POKE 33501,0 to skip the first screen, or alternatively you can POKE 33501 with a one or a two to make the game a little harder to complete. You can also POKE 33509 with the required number of lives (though beware of high numbers corrupting the screen display), or POKE 33693,0 for more straightforward infinite lives. You can also POKE 33721 with the number of peppers required, or POKE 43105 for unlimited peppers (this has to be one of the strangest POKEs ever!).

A couple of months ago I described the annoying aspect of Ultimate's loading programs, in that they include all the important bits in line number zero; this meant you had to duplicate the line to make them work. Well, I had loads of letters telling me that POKE 23756,1 changes it into line 1 (which I must admit I did know). Trouble is, it doesn't work if you've invested in an Interface 1 unit. Lucky (?) Interface 1 owners should resort to:

```
POKE (1+PEEK 23635+256*PEEK
23636),1
```

Which is slightly more long-winded!

Like everyone else, I've had it up to here with *Jet Set Willy.* But it's U-turn time, and all because of a letter from **Mike Smith.** To get the mysterious object in the First Landing, he supplied probably the best *JSW* POKEs I've seen in a long time, namely POKE 56350,0: POKE 56358,0: POKE 56365,85. What these fiendishly simple POKEs do is add a platform so that you can go to the cross and get the object. Now, where was I? Oh yes, I've had it up to here with *JSW* POKEs.

Another interesting letter provided an infinite lives POKE for Interstella's *Defenda* — POKE 35730,52. This gives you 52 lives, but every time you get killed it gives you another life! Whoever wrote the letter described him/herself as **'The Led Zeppelin and RML380Z Freak from Handsworth'**. Well, we all know *Led Zep,* but who's heard of 'RML380Z' — they must be a Brummy band!

On the international front, **Bjarne Nielsen** of Denmark sent in a 100-lives POKE for *Moon Alert* — POKE 42404,255. Nice to hear from you Bjarne . . . and nice too to receive my first letter from a hacker of the fairer sex. **Susan Bowman** wrote in to ask for general help on hacking. Well, Susan, it's a bit difficult to give you a lot of help in this column, but I hope you've read carefully the two *YS* articles by Terry Bulfib on codebusting . . . there's a trick or two in there that just might be what you're looking for.

In *YS* issue 9, I mentioned the 'Hi Chris' phenomena in *Cavalon* — all you have to do is hold down all the keys and the message 'Hi Chris' pops up on-screen. Hah, I'd only scratched the surface! If you wait until the man is stood in the maze and then type 'JSWILLY', you can also get the message . . . then, if you want to press keys '1' to '6', you can start from any of the screens. This little gem was supplied by someone living in Cheshire who wished to be known only as **'Gremlin'**. (It seems that complete lunacy is rapidly becoming a prerequisite for contributors to *Hacking Away!*) Of course, you could always take **Sean Gorden**'s advice and just hold down keys 'D', 'F', 'R', 'T', 'I', 'K' and 'L' to get the message on-screen.

Nigel Osborn wrote in with POKEs for PPS's *Maze Death Race,* to prevent it crashing with Interface 1 connected. The method he subscribes to is to POKE a zero into the following locations: 26689-90, 26730-1 and 26771-2. **Paul Hargreaves** described his first attempts at hacking into *Horace Goes Skiing* to find an 'infinite money' POKE. Needless to say, he was unsuccessful, but he did find a POKE that removes all the traffic from that very busy road — and that's POKE 29270,0. He also reveals the code words for Carnell's *The Crypt,* which are numbered one to six . . . they are 'Carnell', 'Software', 'beats', 'all', 'the' and 'others'. Hmm, very modest!

FRONTLINES

FLAT SCREEN SPECTRUM?

Following Sinclair Research's manic secrecy over the Spectrum+, it's somewhat surprising to already be hearing rumours about a second Spectrum derivative. But with a possible release date of mid-1985, this version of the machine is planned to be fully portable and compatible with all existing Spectrum software.

The low-down on this new micro is that it's aimed at the Spectrum owner who can't bear to be without it at any time and, in particular, the business user. So far unnamed, it's supposed that it will incorporate Sinclair Research Flat Screen technology, though it'll no doubt plug into a normal TV. Reports are that Sinclair Research is currently devoting much of its energy towards developing the Flat Screen TV into something suitable for it — say about five by six inches. The reincarnation may also have a built-in Microdrive, although it's not yet clear whether it will include all the features of the Interface 1 (RS232 interface, networking facility, and so on).

Current speculation seems to suggest that the new machine will resemble the American version of the Spectrum, incorporating a similar keyboard, but with hard-topped keys; the Microdrive replaces the cartridge slot on the right-hand side of the American Timex 2000. It's presumed that the flat screen will fold down over the keyboard, making it ideally suitable for carrying around in a briefcase.

The memory will consist of new CMOS chips which use very little power, thus allowing the machine to



Would you buy an electric car from this man?

run for long periods on the batteries; the battery power source will probably be the type already used in the Flat Screen TV, though it's not known if these will be rechargeable.

The price of the machine is predicted to be around £300. As Nigel Searle, Sinclair Research MD, stated in an interview with *YS* late last year, any business machine produced by the company woud bear the QL logo — it will be interesting to see how the new micro fares. To QL or not QL?

AN OLD-FASHIONED EMPIRE

Imperial Software has come up with an altogether more subtle, sophisticated and, one could say, satisfying path to galactic domination.

Empires is a game for three players plus a gamemaster (Umpire): there's also an expansion kit, allowing up to three more players, called *The Umpire Strikes Back.* It's not a simple *Kingdoms* variant where you have to build and maintain fleets, there are many other factors involved, entailing lots of forward planning.

The game certainly seems intriguing — but just to find out for sure, we've set some crazed megalomaniacs at each others throats in a play test. Further reports will follow.

VINTAGE STUFF

Ian Hoare, professional freelance chef and creator of Bug Byte's *Cook Book* series, is now working for Peter Dominic writing a program to help you make the critical choice of which wine to drink with your meals.

The program, called *Vino File*, is being marketed by Peter Dominic wine merchants and will be sold through some 460 retail outlets throughout the UK.

Each selected store fitted with a Spectrum+ will also have an Alphacom 32 printer so that your selection of wines can be taken to the counter without you stammering over the odd pronunciation.

A price has yet to be set for the package, but no doubt if you ask the assistants in the Orange Street branch of Peter Dominic in London and ply them with a little Mouton Rouge '52, they'll sell you the package at a nominal fee.



***Vino File*'s Ian Hoare.**

HARD FACTS

DIY demon Stephen Adams offers advice on your hardware hassles — contact him at Hard Facts, Your Spectrum, 14 Rathbone Place, London W1P 1DE.

First of all, thank you for all the letters you've sent into the *YS* hardware hacking column. What I'll try to do is to answer as many questions as I can that'll help others out there solve their own problems. If your Spectrum looks really sick, the best place for it will be in a jiffy bag winging its way back to its manufacturer or a recommended repair outfit.

One of the first letters I received was from **Marc Aldrich** of Cheadle. His first problem occured when he got his Spectrum power supply back from a local repair shop, only to find that a heat resistor had been bridged over with a single piece of insulation wire. Well, quite simply, your power supply now sounds like a very dangerous piece of kit! If you want to put a new fuse in on your own, look to CPC (Sinclair Research's distributor for spares) at 194-200 North Road, Preston, Lancs PR1 1YP (Tel. 0772 555034).

Marc's other hassle involved his Microdrives and Interface 1 device — whenever he plugs the PSU in, either the Microdrive whirrs into action and refuses to stop or as soon as an Interface 1 command is used, the screen's border is filled with coloured flashing squares. Hmm . . . it sounds like you've got gremlins in your 'power-up-on-reset' circuit. Try speeding it up with a 10KOhm resistor from the +5 volts line to the RESET line at the back of the computer. Better still get in touch with TV Services of Cambridge, French's Road, Cambridge CB4 3NP (Tel. 0223 311371) and get them to do it for you.

David and **Craig Allen** from Swinton wrote in to say that they're having problems loading and saving programs using a Philips TX 14-inch black and white TV; they're especially confused as all seems OK once the set's turned off.

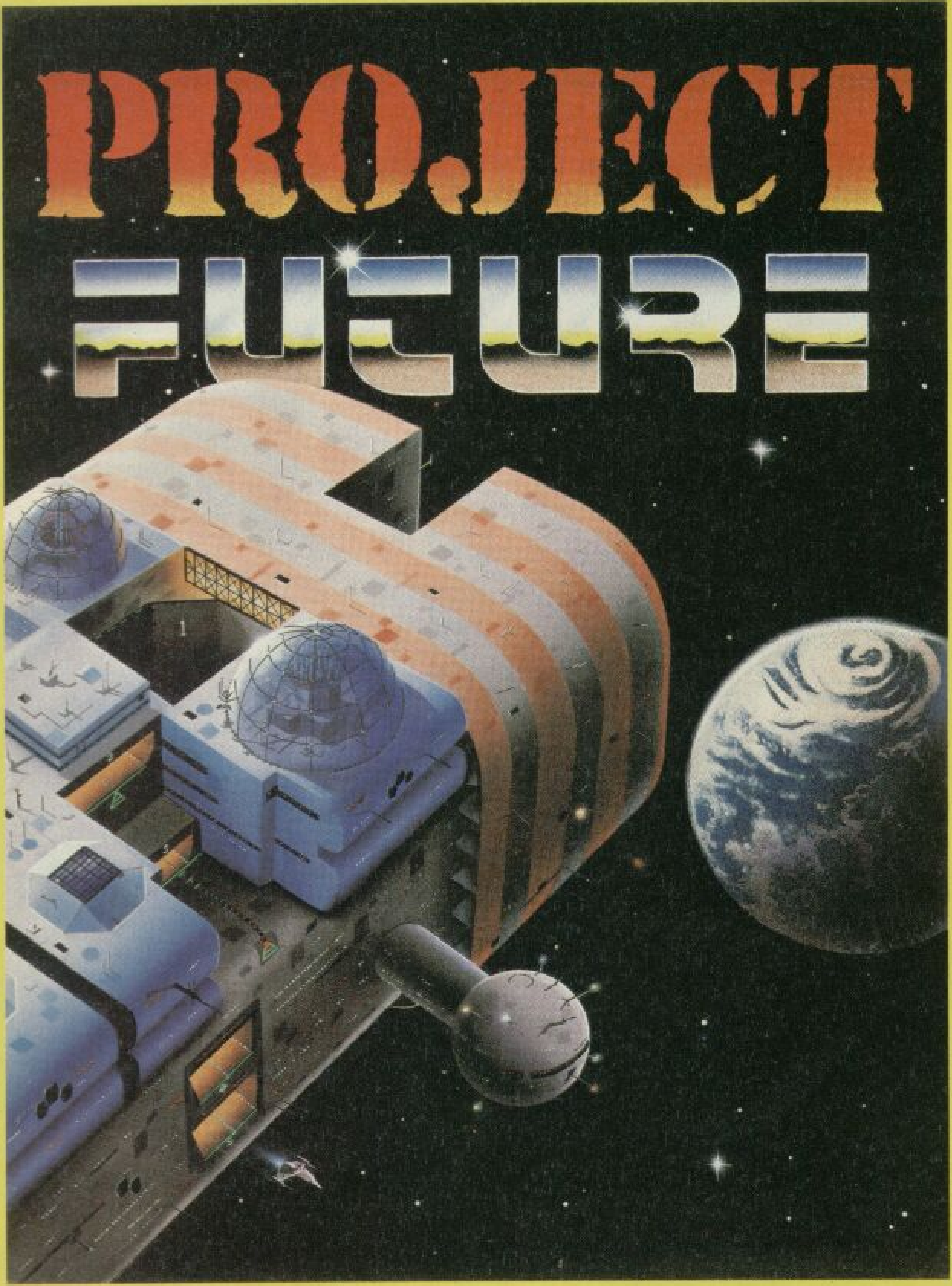
Well, briefly, the trouble's inside your TV; it's somehow connecting the zero volts line of the computer to one side of the mains supply, which is then feeding into the cassette recorder and ruining the tapes. Yes, you've guessed — this is very dangerous, and should be fixed immediately!

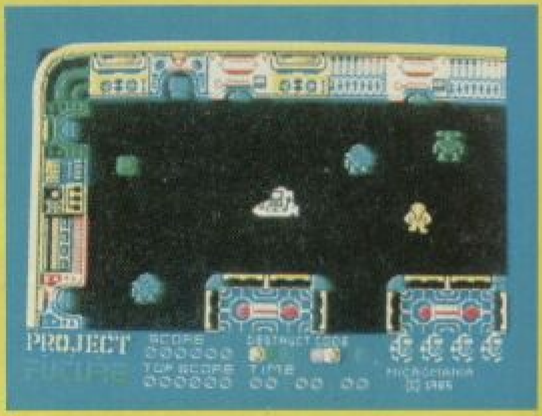
Our last letter comes from someone who obviously wants to go through life anonymously, if his/her signature is anything to go by . . . The problem seems to be that, if the Spectrum is used in tandem with a printer, Interface 1 and Microdrive, as well as a VTX 5000 modem, whenever a Prestel page is flashed up on-screen — it vanishes; all that's left is a blue border and screenful of fancy graphics.

It does sound as if you might be overloading the Spectrum power supply unit, if you're running the Microdrive, printer and modem all at the same time. However, it's worth checking to see if there's a loose connection between the Interface 1, Spectrum and/or the VTX 5000.

That's enough for this month . . . but if there's anything 'funny' happening inside your Spectrum or any of its associated peripherals and you suspect it could be hardware, don't hesitate to drop a line at Hard Facts, *Your Spectrum*, 14 Rathbone Place, London W1P 1DE.


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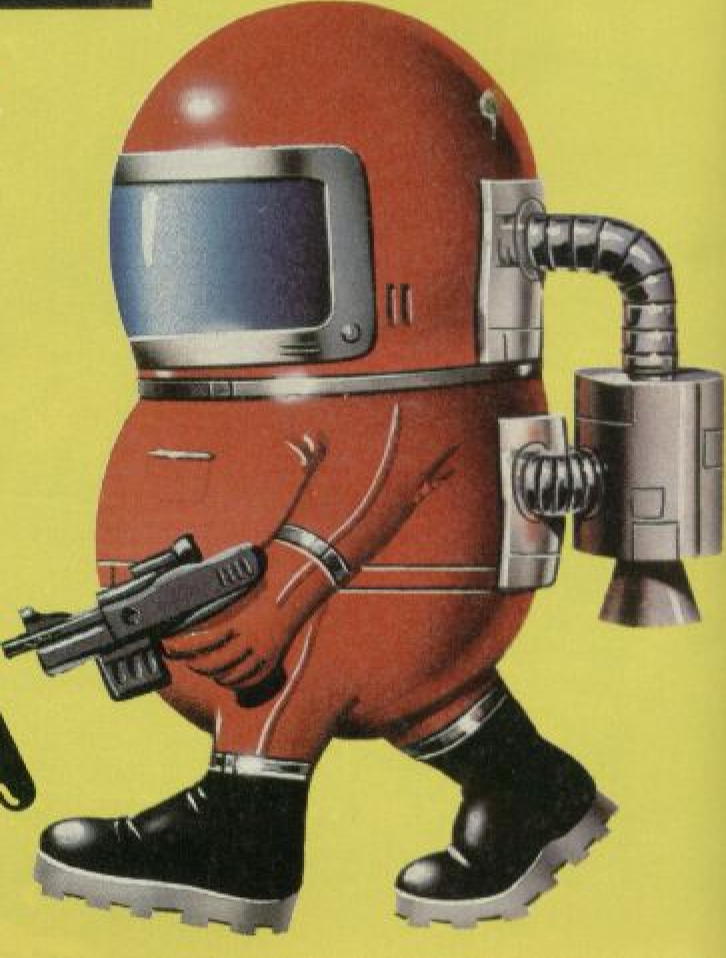
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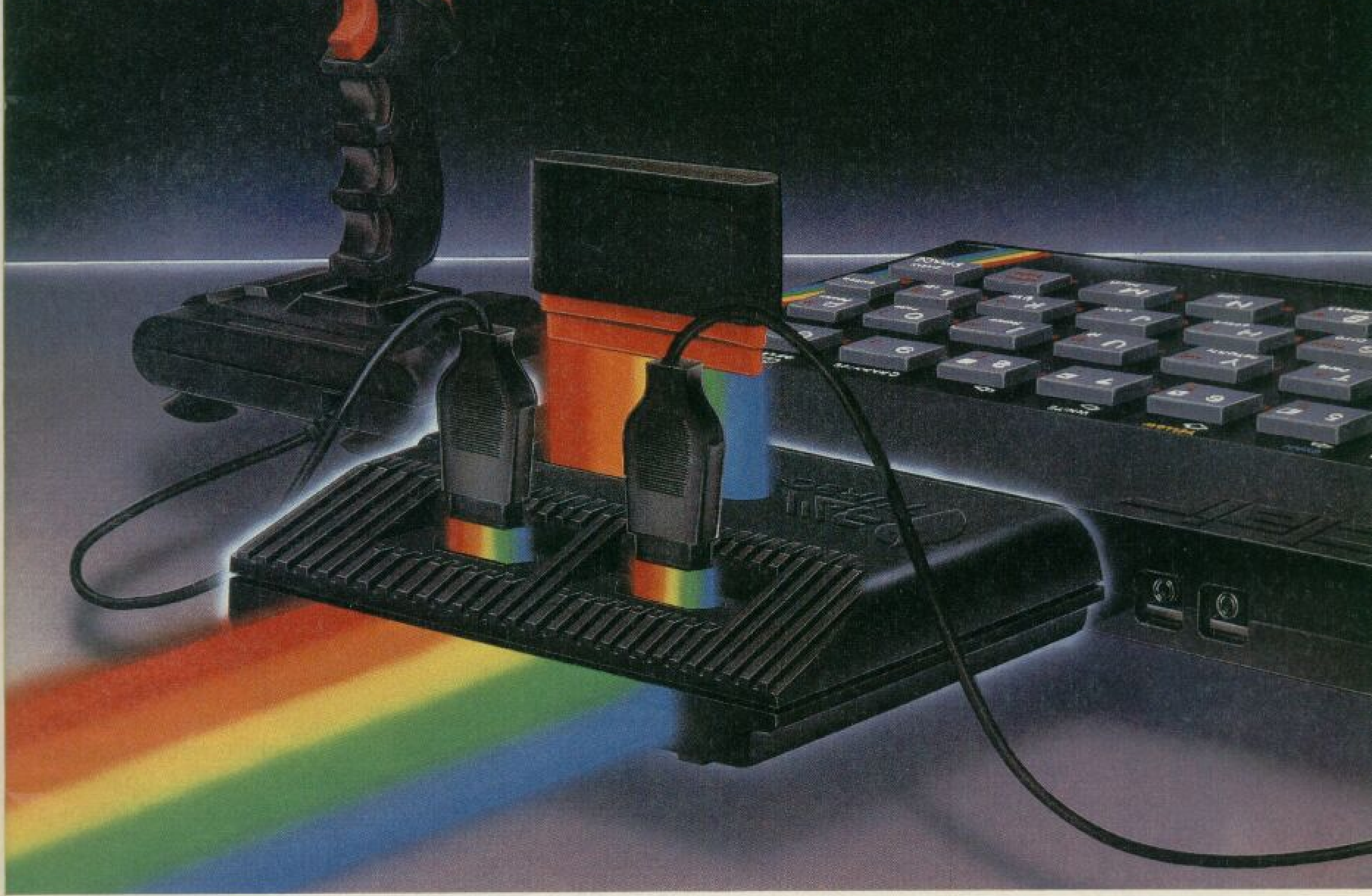


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PAPERDATA

MACHINE CODE SPRITES AND GRAPHICS

John Durst/Sunshine Publications

Author John Durst tells us right from the start that the object of the exercise is to discuss the Spectrum display, machine code techniques and animated sprites; nothing covered in this book calls for the addition of peripherals.

Chapter one goes into all the things you'll need to know to help you program well in machine code on the Spectrum.

ROM routines have an important part to play in machine code programming and Durst explains the Save routine thoroughly, detailing how the header information is stored and how to play various tricks with it.

In fact, as you can tell from the title, graphics play an important part in Durst's book. He talks about the character set and provides us with various routines to make it appear twice, four and even eight times its normal size, and others to make it bold, extra tall and extra wide. There are still more routines which turn characters on either side or upside down!

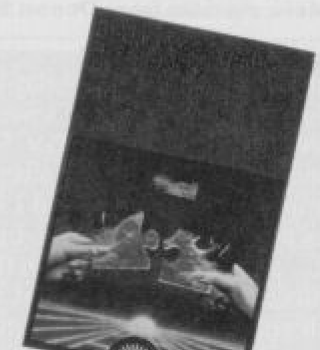
Soon, we're getting very in-depth about sprites and animation. The first four sprite routines are none too impressive, but they do get better. The author talks of the Matte process — which does get a little confusing — but despite all that, at the end of it you're left with a pretty good sprite system.

Here, and not a moment too soon, Durst adds some colour to the subject in the form of a number of attribute handling routines.

The last few chapters give details on interrupt routines and what can be done with them, plus a tutorial on how to produce sound effects. They also set out to explain how to write efficient machine code.

For £6.95, this is one of the best attempts at the subject I've seen so far.

Tony Samuels



COMPETITION CHEETAHS

At last! The results of our *extremely* popular Cheetah competition can be revealed. Thanks to all of you who took part and congratulations to all those who won a prize. For those that didn't — well unlucky! But there's always another time...

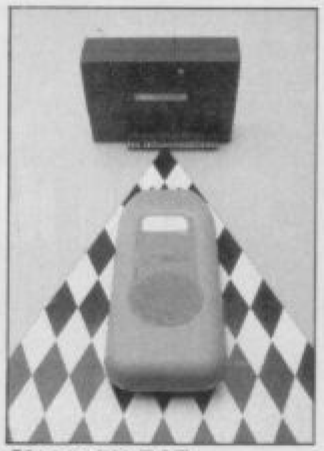
On to the winners. First prize winners in all three age groups receive a Cheetah RAT and they are: **Craig Smith,** Sheffield; **N Hopkins,** Kemnay; **Chris Melton,** Whitby; **Paul Rowland,** Coldwaltham; **G Officer,** Hartlepool; and **MG Morris,** Shirley.

Second prize winners each receive a Cheetah Sweet Talker and they are: **Joanne Tock,** Selby; **Vincent Potter,** Yarm; **George Leys,** Aberdeen; **Daren Chandisingh,** Lancaster; **D Hubbard,** Cleckheaton; and **Morag Paskins,** Chichester.

Our third prize winners receive copies of the latest games software from CheetahSoft — *Perils of Bear George, Dragon Fire,* and *MoonSweeper.* They are: **Stuart Masters,** Upminster; **Peter Wilman,** Wigan; **Philip Asprey,** Solihull; **Christopher Biggs,** Teignmouth; **Rev RF Campbell,** Newcastleton; and **M Baker,** Bristol.

Finally, 14 runners-up in each age group receive either *Conquest* or *3D Bat Attack.* They are: **Ian Dogget,** Ipswich; **Catherine Alexander,** Port Talbot; **Christopher Johnson,** Milton Keynes; **Andrew Godfrey,** Lowestoft; **Paul Houlton,** St Helens; **Michael Durkin,** Droitwich; **Kevin McCarthey,** Langholm; **Wayne Henry,** Brixton; **Alison Wainright,** St Helens; **David Parry,** Liverpool; **J Ledbrook,** Dawlish; **Paul Lockett,** Altrincham; **Paul Stewart,** Glasgow; **Stefan Tock,** North Duffield; **David Walker,** Liverpool; **Glen Sunter,** Bolton; **M Mead,** Bourne; **S Atkins,** Welling; **Adrian Kay,** Chesterfield; **Martin Rigden,** Whitstable; **J Baron,** Abingdon; **Stephen Tiffant,** Leeds; **Nick Wood,** Middlesborough; **Simon Crowfoor,** Fakenham; **Roberto Paolacci,** Derby; **Darren Hall,** Stoke-on-Trent; **Peter Burrows,** Middlesborough; **K Croudace,** Wymondham; **Valerie Day,** Walthamstow; **DJ Goodhand,** Warley; **S Samways,** Lincoln; **GA Smith,** Seaford; **Barry Burrows,** Birmingham; **D Sheppard,** Southend; **P Camp,** Oxford; **M Toms,** Walsall; **Miles Osborne,** London; **TB Priestly,** Manchester; **James Gouck,** IOW; **K Pound,** Penn; **P Whichello,** Brentwood; and **Helen Zuchowska,** Birmingham.

All the prize-winners will be receiving the goodies through the post very soon. And to all of you who didn't manage to win anything in the compo, Cheetah have very generously offered RATs to all *Your Spectrum* readers at only £25 each! Nice one Cheetah!



Cheetah's RAT.

CONCURRENT AFFAIRS

***For all the news and views on the QL market, dispell the rumours with* John Torofex.**

AT SIXES AT SEVENS

Dissatisfied QLUB members who write to Sinclair Research complaining about their membership not being worth £35 are being informed that instead of a mere six issues of *QLUB News,* they'll now receive seven issues in their first year of membership. Sinclair Research will have to get its collective finger out as this means its next five issues will have to be cobbled together in the first six months of 1985.

HARD LINES

Quest still seem to be having difficulties getting its disk drives to work with the QL. The company had a QL with a disk drive attached at Compec last November, allegedly running CP/M 68K. However, as no-one was allowed to touch the QL, we've still to wait for the device itself to find out if the rumours were true that it was really running CP/M off the Microdrives, and the disk drive was just for show.

Simplex Data, although advertising a rather strange-looking memory expansion unit (the board depicted consisted of a chopped-up QL PCB, stuck together with sticky tape), is now shipping units to customers. But the units bear no resemblence whatsoever to the ones advertised — but they seem to work and that's the important thing!

A 'prominent IBM lease-broker' (whatever that is) PCML will shortly be marketing a range of interesting add-ons, rejoicing in the name QL Plus. First off the stocks will be a Z80 second processor and disk interface, which will enable users to run 'proper' CP/M on their QL (and not the unpopular CP/M 68K favoured by Quest). Of course, this means that users will be able to use *WordStar* (instead of the slow and bug-ridden *Quill*) although the cost of the Z80 and disk interface, together with *WordStar,* will add up to more than the cost of the original QL!

And, getting back to disks, CST has announced its own disk interface. Not only that, but the company's decided that the few square inches of unoccupied PC board will contain a couple of 64K RAMs providing a low-cost memory expansion option. Sounds good . . .

FRONTLINES



The winners of *Gardener Merchant*'s childrens painting competition all received a Spectrum and Six Pack amongst their prizes. The paintings have been used in *GM*'s 1985 calendar entitled 'Through The Eyes Of A Child', to be sold in aid of the Save The Children Fund. Pictured here are old friend, Julian Goldsmith — Sinclair's PR man — and Mark Gore, one of the winners in the compo. But we still haven't quite worked out who the geezer in the beard is. Answers on a postcard please. . .

GHOST OF CHRISTMAS PAST?

Ocean Software has just released a new game called *Gift From The Gods,* written especially for it by Denton Designs. But could it be that this is the first program to come out of the Imagine sell-out? John Gibson, the programmer, was at Imagine, and the line-up from Denton Designs looks just like an Imagine group photo — so who's to say that the whispers going around the industry telling us that this is an aborted Imagine game aren't true?

The game itself is a multi-screen affair and nothing to get too excited over. Yes, it's been nicely designed, but the object of this type of game is now rather old hat.

The piccy shows the team responsible for the game. From left to right are: John Gibson, the programmer; graphics specialist Karen Davis; Steve Cane — also on graphics; systems designer Kenny Everitt (*I bet he gets some stick. Ed.*) and computer graphics artist, Ally Noble.

Gift From The Gods is available now from usual outlets at £9.95. Ocean can be contacted on 061-832 6633.



Mere mortals from Ocean Software!

BUSTING MAKES MAC FEEL GOOD

Macsen Software and Central Television have now finished final arrangements for the release of a computer game based around the TV series *Blockbusters.*

The game itself consists of two players competing with each other to answer general questions selected from hundreds stored on cassette. Each correct answer extends the successful competitor's path across an on-screen matrix of four-by-four hexagons. The player who completes this path first wins that round...and the player who wins most rounds is the winner of the game. Get the picture?

Players can set the number of rounds and the level of difficulty; the higher the difficulty level, the shorter the time allowed for answers by the on-screen clock. There's also a sound on/off feature.

Blockbusters is also supported by the follow-up tape, *Questionmaster* — this allows the user to create a database of questions to be used within *Blockbusters. Blockbusters* is priced at £7.95 and *Questionmaster* is £5.95. If you're interested, give Macsen Software a ring on (0267) 232508. (*Who ya gonna call? Ed.*) (*Blockbusters!! T.P.*)

FROM THE H/P



I may have got my own direct telephone line this month, but I still find myself swopping between the office switchboard line and my new phone. Let's get it straight — the YS Helpline phone number is now 01-636 2416, on Wednesdays and Fridays only please!

Anyway, on to some of the callers . Kicking off with a call from **John Press** of Stratford who, after explaining that he'd only just mastered Basic, wanted to know why we printed assembler listings — and, for that matter, what were assembler listings? He couldn't type them into his Speccy and was at a complete loss as to what they were for.

Well, John, these listings are included for those readers who've got pieces of software called assemblers. To put it simply, these are a sort of compiler that work in a language called assembly language. Now, assembly language is the standard form for listing machine code; it isn't actually machine code itself, because the computer has no idea what all those little letters and symbols mean, but each language instruction (or mnemonic, as the jargon goes) has its own corresponding Z80 machine code instruction. If you've got an assembler program, then you can feed the listing (called source code) into your Spectrum and the program will run through the code converting it into pure Z80 instructions.

So, why do we use all this intermediate source code instead of diving straight into pure Z80 machine code? The answer's obvious if you've ever been faced with the pure stuff. It's just a whole bunch of binary ... and even an expert Z80 programmer would have great difficulty understanding a long list of ones and zeros.

There are also programs called disassemblers and monitors which you'll also find useful if you're contemplating becoming a programmer. But that's another story for another day ... if all you want to is to be able to type in the listings from the pages of *YS,* then get yourself an assembler. Packages I can recommend are one from Picturesque and Hisoft's *Devpac 3.*

If that's all gone in one ear and out the other, then give me a bell on 01-636 2416 and we'll talk about it, OK?

A subject I find recurring is a general puzzlement about which RGB monitor and interface to get for the Spectrum. Well, monitors are really a matter of personal taste and how much spare cash you happen to have lying around, but the choice of interface is very limited as there are only a handful of boards available. Personally, I'd suggest you take a good look at the one from Adapt Electronics, 20 Starling Close, Buckhurst Hill, Essex IG9 5TN (Tel. 01-504 2840). It's well-designed, fairly cheap and I've had no problems with it ... but do check out what else is on the market — and if it's good, tell me!

I often get asked questions that seem pretty obvious to me, but then again, they don't seem so easy to answer when you get down to the nitty-gritty. A couple of people wanted to know how to enter Hex dumps when there isn't a Hex loader provided. Well, to be honest, Hex loaders are all pretty much of a muchness and in a mag like *YS* you'll probably find something you can alter to suit your particular application. But then again, a simple little question like that has got us all going here ... Hopefully we'll try and sort you out a universal Hex loader for the April issue.

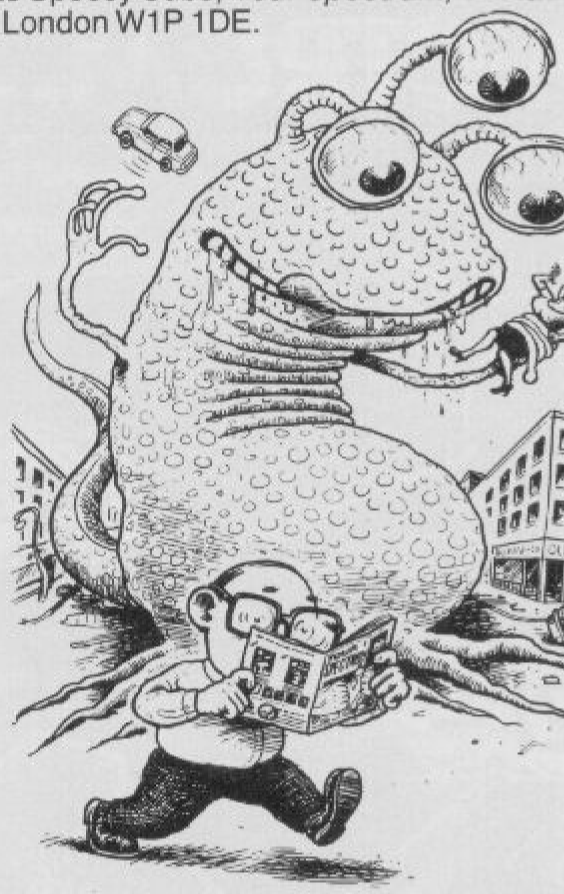
Anyway, that's it for this month — catch you on the 'phones.

Troubleshootin' Pete

Pete's phone lines are open from 10am-1pm and 2-5pm on Wednesdays and Fridays. Ring him on 01-636 2416.

SUBSCRIBE TODAY... AND SEE WHAT YOU'RE MISSING

So who cares if the jolly green giant from Mars wants to take over the world — as long as you've got a regular copy of *Your Spectrum* safely in your grasp, Sainsburys could drop the price of beans for all you care. 'Cos *YS* is not to be missed. Just send off the coupon below and mail it to Speccy Subs, *Your Spectrum*, 14 Rathbone Place, London W1P 1DE.



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TOP 20

• THE YS *READER POLL*

Attention all you gamesters, we interrupt this magazine to bring you the chart you *know* isn't fixed.

This month reveals all sorts of odd happenings. Not only are there bags of new entries, but there's also the reappearance of lots of your favourite oldies.

Thanks to all those who sent in their votes to the *YS Top Twenty* and commiserations to everyone who didn't get to win three great software prizes. This month's winner, drawn at random from the Editor's voluminous hat, is John Williams from Hammersmith, London. Look out for the Postman, John!

So, if you want this chart to continue to reflect your *real* opinions of Spectrum software, you know what to do, don't you? Poll your votes by filling in the coupon at the bottom of the page and send it post haste to YS Charts, *Your Spectrum*, 14, Rathbone Place, London W1P 1DE.

YOUR SPECTRUM

My top five raves on the Speccy are:

1 ____________________

2 ____________________

3 ____________________

4 ____________________

5 ____________________

My three top turkeys on the Speccy are:

1 ____________________

2 ____________________

3 ____________________

Name ....

Address ....

....

.... Postcode ....

I understand that when this chart was tested — eight out of ten owners said their Spectrums preferred it. (*What? Ed.*)

Send your completed coupon post haste to:

YS TOP TWENTY, YOUR SPECTRUM, 14 RATHBONE PLACE, LONDON W1P 1DE.

YS TOP TWENTY CHART

THIS MONTH	LAST MONTH	MONTHS IN CHART	TITLE / PUBLISHER	COMMENT
1	3	9	**JET SET WILLY** SOFTWARE PROJECTS	BACK AT THE TOP AGAIN! WILL WILLY NEVER LEAVE THE CHARTS?
2	2	2	**DALEY THOMPSON'S DECATHLON** OCEAN	OLYMPIC THRILLS ... WITHOUT LEAVING YOUR ARMCHAIR!
3	4	8	**TRASHMAN** NEW GENERATION	NO MUCKING ABOUT, TRASHMAN'S BACK — RISING UP THE CHARTS WITH A VENGEANCE.
4	1	6	**SABRE WULF** ULTIMATE	ULTIMATE'S HIGHEST THIS MONTH. THAT DOESN'T SAY MUCH FOR **UNDERWURLDE** AND **KNIGHTLORE**!
5	NEW	1	**UNDERWURLDE** ULTIMATE	THE SEQUEL TO **SABRE WULF** IS THIS MONTH'S HIGHEST NEW ENTRY. CAN IT MAKE IT TO THE TOP?
6	12	3	**TLL** VORTEX	FLYING HIGH IN THE CHARTS IS THIS 3D PLANE GAME. WHAT DO YOU THINK OF THE SEQUEL **CYCLONE**?
7	NEW	9	**MANIC MINER** SOFTWARE PROJECTS	GOOD GAMES NEVER DIE, THEY JUST MAKE A CHART COMEBACK! THE ORIGINAL PLATFORM GAME WITH MINER WILLY.
8	NEW	1	**SPLAT!** INCENTIVE SOFTWARE	A REAL OLD CHESTNUT IS THIS ONE ... BUT IT'S STILL A GREAT GAME!
9	NEW	1	**PYJAMARAMA** MIKRO-GEN	IT'S ONE LONG NIGHTMARE IN THIS PLATFORM GAME. DEFINITELY NOT FOR LIGHT SLEEPERS!
10	NEW	9	**CHUCKIE EGG** A 'N' F SOFTWARE	ONE OF THE EARLY MANIC MIMICS ... BUT ONE OF THE BEST! COLLECT THE EGGS BEFORE THE DUCK GETS YOU ...
11	NEW	1	**JASPER** MICROMEGA	WHAT THE FURT'S GOING ON HERE? MORE BUNGLING IN THE JUNGLE WITH JASPER.
12	NEW	3	**FOOTBALL MANAGER** ADDICTIVE GAMES	DRIBBLING UP THE OFFSIDE. THIS CLASSICS STILL KICKING. IT'S NOT THE EASIEST JOB TO TACKLE, THOUGH ...
13	7	9	**ATIC ATAC** ULTIMATE	YOU'D HAVE THOUGHT SOMEONE WOULD HAVE LOCKED THIS IN THE LOFT BY NOW!
14	20	4	**THE HOBBIT** MELBOURNE HOUSE	MORE OF YOU SEEM TO BE GETTING THE HOBBIT HABIT.
15	NEW	1	**KNIGHTLORE** ULTIMATE	**KNIGHTLORE** AND **UNDERWURLDE** BATTLE IT OUT FOR THE ULTIMATE POSITION.
16	NEW	1	**THE HULK** ADVENTURE INTERNATIONAL	THIS ONE'S SURE TO TURN THE COMPETITION GREEN.
17	NEW	4	**FULL THROTTLE** MICROMEGA	ROARING BACK INTO THE CHARTS, THIS POPULAR BIKE GAME'S BACK ON THE CIRCUIT. BUT WILL IT GET INTO SECOND GEAR?
18	8	2	**FIGHTER PILOT** DIGITAL INTEGRATION	FIGHTING FOR A PLACE IN THE **YS** TOP TWENTY, THIS ONE LOOKS AS THOUGH IT'S ABOUT TO RUN OUT OF FUEL.
19	6	6	**LORDS OF MIDNIGHT** BEYOND	HAVE YOU LOST INTEREST IN THIS 32,000 SCREEN ADVENTURE?
20	13	9	**CHEQUERED FLAG** PSION	IT LOOKS LIKE THIS ONE'S NOW STUCK IN REVERSE GEAR.

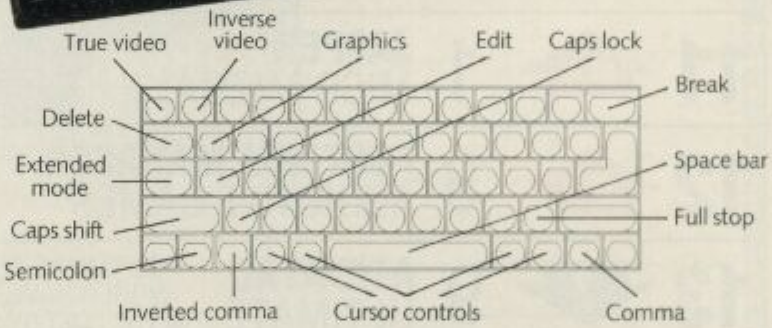
JOHN HALLET

New-the official Spectrum Upgrade!

Turn your Spectrum into a Spectrum+ for just £20



- Professional full-size keyboard – includes 17 extra keys.
- Responsive typewriter-style action.
- Accepts all current Spectrum software and peripherals.
- Complete with 80-page User Guide and Companion Cassette.



Here's some exciting news for 48K Spectrum owners ... the official Spectrum Upgrade Kit.

The £20 Kit has everything you need to turn your Spectrum into the stylish new Spectrum +. You don't even need an understanding of electronics, just the ability to solder a few wires together! The leaflet in the kit gives clear, step by step instructions.

If you're not sure about doing it yourself, don't worry. Simply return your 48K Spectrum to Sinclair and for £30 we'll upgrade it for you.

Whichever you decide on, you'll also receive the new 80-page User Guide and Companion Cassette.

The bigger, better Spectrum keyboard

The Spectrum + measures 12½" x 6." It has a large typewriter-style keyboard, with hard, moulded keys.

You'll find the new keyboard has a smooth, positive action – ideal for touch-typing, word processing, simulation programs, and extended programming sessions. Two retractable legs give a perfect typing position.

There are 58 keys in all, including 17 new keys. Programmers will be pleased to see dedicated punctuation keys, a space bar, and separate shift keys for graphics and extended modes. And a reset button allows you to clear a program from your computer's memory without disconnecting the power supply.

The official Spectrum Upgrade

Naturally your upgraded computer will accept all the peripherals in your Sinclair system - Interface 1, Microdrives and so on - as well as all Spectrum software.

Just as important, new Spectrum software and peripherals will be designed with the Spectrum + in mind. So the Sinclair upgrade adds stylish looks, new capabilities ... and new potential for the future.

Included – the new Spectrum + User Guide and Companion Cassette



The new User Guide has over 80 pages of information, including a handy BASIC dictionary. The Companion Cassette provides an interactive tour of the new keyboard, and includes three entertaining arcade games.

TO ORDER BY MAIL:

When ordering the Upgrade Service, send off your 48K Spectrum to the address below, carefully wrapped, together with the completed coupon and appropriate payment. (Please do *not* return the mains adaptor, manual or other ancillaries.) Your upgraded computer will be despatched to you within 10 days of receiving your order.

When ordering the Upgrade Kit, simply complete the coupon, enclosing the appropriate payment and post it to us at the address below. Please allow up to 28 days for delivery.

BY PHONE: Access or Barclaycard holders can call Camberley (0276) 685311 for personal attention, 9am to 5pm Monday to Friday. Only the Upgrade Kits can be ordered by phone.

Please note: the upgrade offer applies to working 48K Spectrum models in the UK only.

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All prices include VAT, post and packing, User Guide and Companion Cassette.

☐ Please send me the Spectrum + Upgrade Kit. I enclose payment of £20.

OR

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Please charge my Access/Barclaycard no.

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PLEASE PRINT

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YOS 503

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FORUM

Is there something you're not telling us? Don't miss out on the chance to win a bundle of free Spectrum software for each month's Star Letter! Write to Forum, Your Spectrum, 14 Rathbone Place, London W1P 1DE.

OUTPUT INPUT

Thank you for putting my free classified advertisement in your magazine. I've had many replies from people from all over the world including England, Northern Ireland, Switzerland and Israel. I now have many Spectrum user friends. But if anyone else would like to write to me, I'd be pleased to hear from you.
Scala Fabio, Via Pegaso, 7, 47037 Rimini, FO, Italy

Hmm, sounds like a nice person. But if Scala Fabio's not your cup of tea, check out the 'Pen Pal' section in this month's Input/Output. OK, you may not find a friend for life... but you might end up swopping software, selling off your redundant peripherals and being able to afford all *the latest games. Ed.*

WHEN IN DOUBT ... DIY

In response to the somewhat desperate sounding plea from Anthony Mayers of Wrexham in issue 10 and despite being in no doubt that you will by now be fighting your way from beneath a deluge of letters (all containing listings for Hex to Dec conversion) I would

```
  10 PRINT AT 0,3;"HEX TO
 DECIMAL CONVERSION"; OVE
R 1;AT 0,3;"_____________
_____________"; PRINT
  20 POKE 23658,8
  30 LET n=0
  40 INPUT "HEX NUMBER PL
EASE..1 TO 4 DIGITS"; LIN
E A$
  50 FOR F=1 TO LEN A$
  60 IF A$(F)<"0" OR A$(F
)>"F" THEN  GO TO 40
  70 NEXT F
  80 IF LEN A$>4 THEN  GO
 TO 40
  85 IF A$="" THEN  GO TO
 40
  90 LET C=1
 100 FOR F=LEN A$ TO 1 ST
EP -1
 110 IF A$(F)>="0" AND A$
(F)<="9" THEN  LET D=VAL
A$(F): GO SUB 200
 120 IF A$(F)>="A" AND A$
(F)<="F" THEN  LET D=CODE
 A$(F)-55: GO SUB 200
 130 LET C=C*16
 140 NEXT F
 150 PRINT "HEXADECIMAL "
;A$;" = DECIMAL ";N: PRIN
T
 160 BEEP .2,10: BEEP 1,1
0
 170 GO TO 30
 200 REM **ADD TO THE DEC
. NUMBER **
 210 LET N=N+D*C
 220 RETURN
```

Derek Hirst has the answer with this Hex/Dec convertor.

nevertheless like to submit my own version.

It's written in simple Basic statements ('cos I don't know any other way!) and, though the 'nitty-gritty' is contained in nine or ten lines, the few extra make it much nicer to use. Hex numbers from zero to FFFF (65535_{10}) are allowed.

I'd like to suggest an alternative to solution five in Anthony's letter — that is DIY! It's much more rewarding. So, come on Anthony, let's see the reverse of this program using similar statements to these.
Derek Hirst, Barnsley

Yeah, c'mon Anthony ... let's see what you make of that. Of course, if anyone else wants to write in instead, it'd be nice to hear from you! Ed.

THANKS FOR THE MEMORY?

I was very interested to see in your mag an extension to the Spectrum's 48K memory (XK PCB) in kit form. So, as a loyal follower of *YS*, I promptly went out and bought it. It's now fitted and I'd be grateful if Stephen Adams could answer a couple of points for me.

When I actually load up the XP Basic software, everything seems fine until the end. All I get on the screen is the message 'RAM FOUND AT PAGE 255'. Shouldn't I hope for 'RAM FOUND AT PAGES 127, 255'?. Does this mean that the supposedly faulty side of the chips, etc, is in fact faulty and useless?

You also mentioned that the memory could be extended (potentially) to 4096K. Would this be 128 pages of 32K? How could all this be done using an 'extra power source'? If you happen to have precise details I'd be interested to hear something about them.
G R Charles, Birmingham

You appear to have something wrong with your kit — a possible wrong connection. You'll get the message 'PAGE 255' because the data input is not indicating that the XK System is fitted. A way to test the system is to type 'PRINT IN 253' and if you get '126' printed up on-screen, everything is OK. There's actually 130 pages of 32K, but you get two pages of 32K inside the Spectrum! Extra power and RAM packs are necessary for the full 4 Mbyte memory expansion, but just the RAM pack is required for 64K. If you want this fitted, have a word with the nice people from Spectrum Electronics, c/o Micro Computer Systems, 110 Leagraves Road, Luton, Bedfordshire. It'll cost you £100 for the complete Spectrum 'memory-lift'. Stephen Adams.

IT'S THE PITS!

I thought the following tip might be of use to any reader using a ZX Printer or any other four inch wide paper printer.

Since printouts always seem to get messed up if left about, I wanted some way to keep them all safe. Funnily enough, the container from BIC razors (15 razor pack) is the perfect size for storing rolled up printout. And if they're good enough for John McEnroe...

Of course, there's always an alternative ... if your programs are all as bad as mine, try wrapping the printout around an empty toilet roll centre. It can then be left in the bathroom and put to good use.
Dave Vickers, Lincoln

I suppose we must consider the possibility that some of you out there don't shave. So, next month we'll be giving you hints and tips on (1) how to sneak in the bathroom and steal a BIC container and (2) how to get Dad to buy the 'orrible things in the first place. Of course, as Dave says, there's always an alternative... Ed.

WRITE ON!

Concerning the DIY Centronics interface project in *YS* issue 6 and 7, it's easy to convert it for use with *Tasword Two*, especially as you can use its own print routine instead of the published driver software.

First up, load *Tasword Two* and return to Basic. POKE the following values: 57978 to 57991 inclusive with zero; 58004,98; 58008,63; and 58012 to 58020 inclusive with zero. Now, enter the Basic lines provided; it may be necessary to alter the line feed

```
 251 LIST i=14: PRINT AT
i,0;"No. of copies? (1)";
 GO SUB 6000: IF a$="" TH
EN  LET a$="1"
 252 LET k=VAL a$
 277 OPEN £2,"p"
 278 FOR i=1 TO k
 279 OUT 63,127: REM Dele
tes last character in the
 printer buffer
 281 CLOSE £2: CLS : PRIN
T AT 19,0;"Press the q ke
y to quit printing"
 282 IF i<k THEN  PRINT £
0;"Press any key (except
q) for   next copy": PAU
SE 0
 283 IF PEEK 23560=113 TH
EN  LET i=k
 284 OPEN £2,"p": NEXT i
 288 CLOSE £2
```

Craig's wordprocessor mod. Note '£' signs should be '#'s

code to zero if your printer has auto-line feed.

Run the program and save a copy of *Tasword Two*. If the interface and printer are connected, you should now be able to specify the number of copies to be printed and abort printing if so desired.
Craig L Joly, Sutton, Surrey

So, we'll be expecting all your letters wordprocessed for Forum in future. You've got no excuse now! Ed.

CURE FOR INSOMNIACS

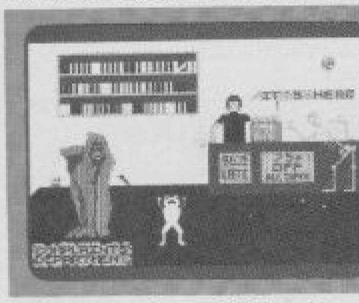
Having just purchased a Taxan/KAGA KP 810 printer for use with my Spectrum, I remembered reading something of an article about a program that would allow me to dump screen graphics to a printer. Ploughing my way through my growing pile of *Your Spectrums*, I eventually found the article entitled *Dumps of Distinction*. Unfortunately though, the article glibly states that all one has to do is simply re-write the machine code to suit one's own printer and interface combination (the Interface 1 unit I have is from Miracle systems). To 'simply re-write' a machine code program may be the sort of thing that some superhuman race can cope with but is as yet not within my range of abilities. Can anyone come to my rescue?

While on the subject of machine code, I've attempted to read numerous books and articles on the subject but find it incredibly difficult to keep from falling asleep. However, I did read an article in another computer magazine (*Shame on you! Ed.*) which adopted a slightly different approach. They used a common Basic routine and converted it into

machine code step-by-step; this made it look so simple that I actually attempted to incorporate a similar routine into a program *I* was writing. Why don't you run a regular feature along this line? Learning by example beats hours of boring reading that seems to get you nowhere!
DB Snow, Oakham, Leicestershire

'Fraid no-one round here's very familiar with your make of printer — but that doesn't stop any of our intelligent, witty and co-operative readers coming to your aid ... does it? As far as machine code goes — our policy is to include small machine code routines that'll prove useful in your programs, give you a full explanation of how they work and how to customise them. Once you're familiar with its operation and usefulness then, and only then, will you find it easier to grab hold of a book/magazine tutor and learn to ... Zzzz. Troubleshootin' Pete.

KARTOON KAPERS



L Boorman from Chichester sent us a program called Cartoon that he wrote with his mate, *Mav*. As you can see, the graphics are very entertaining and there's no less than two story lines in the program. On the left, there's a customer in a shop complaining that his tape won't load — he's then transformed into a frog and told to 'hop it'! On the other side of the shop, a man's waiting for his QL to arrive . . . but when it does, his rotting skeleton has turned to dust.

CHUCKING UP?!

Regarding your article *Hacking Away* (*YS* issue 10). Having played about a little with the program for 'filling in holes at the screen bottom' in *Chuckie Egg*, I discovered some rather interesting (yes, you've guessed it) ... BUGLETS!

Buglet number one is when you lose a life on screens thus 'hacked about' with, part of the duck's cage disappears, together with the tops of several ladders. This bug is extremely prominent on levels five and seven. And now for...

Buglet number two. When on any level you fall off a lift near the bottom platform of the screen, the farmer performs a series of very unusual and very entertaining little hops until he reaches any side of the screen, And there he stays until the inevitable happens ... he gets pecked!

Buglet number three is a level five occurrence deriving from the previous hiccup. Our friend the farmer gets seized by an insatiable desire to get to the top of the screen, floating up bouyantly with outstretched arms until he meets the end of 'that particular life'.

Very unfortunate hiccups (hic!) in an otherwise excellent game. In my (and your) opinion, *Chuckie Egg* is the best release from poor old A'n'F (what a fate to be taken over by Ocean!!).
Paul Smith, Bourn, Cambridge

It's those Gremlins again ... I never should have fed them after midnight! I'm afraid we left out one number from the data statement in line 1000 — the omitted item was '87' and it fits in after the first '40713' in the line. Still, it sounds like you had some fun anyway! And what's that about A'n'F? Are you a professional rumour-monger — or are you just doing this in your spare time? Troubleshootin' Pete.

KEYBOARD KLASH!

We're always pleased to have our products featured in magazines of the calibre of *Your Spectrum* and we looked forward to reading your report. Sad to say, however, we were very disappointed by the observations and conclusions made about the Transform keyboard.

The keyboard was designed specifically to obviate the need to strip either the Spectrum or its power pack from their respective cases in order that the user may simply fit them both into the new case. Also, both the LED and the on/off switch are arranged to be connected without the need to solder at all; special clip-on connectors are provided for this purpose together with full instructions on how to make the connection. Contained in this instruction sheet is our recommendation that the completed set be earthed and again the procedure is described and we also supply the necessary connection aid.

The case itself is constructed in two main parts, the top of which is made of anodised aluminium 18 guage (1.2mm) and the base of mild steel 20 guage (1mm). It's hard to see how, with this specification, the case can be described as 'flimsy'.

We guess that you may not have had the time to set up and use the Transform keyboard personally and hope you will appreciate our disquiet at the inaccuracies which have perhaps resulted in this omission ...

Many potential buyers look to magazines like yours for accurate product information before making their purchase and of course they'll tend to take your printed words as 'gospel'.

To end, perhaps I can tell you that we have received a number of calls from existing customers urging us to write to you to set the record straight and one or two have actually written to you direct (*Hmmm! Ed.*).

We are proud to be able to tell you that we have among our many happy customers, professional journalists and writers — some, in fact, in the computer trade. These people currently use the Transform keyboard in preference to others on the market.
Michael Mackenzie, Transform Ltd

I'll take the points in the order that you've raised them.
1. You must *take the top off the Spectrum's case to remove the original keyboard and get at the keyboard connector. The review states quite clearly that the bottom of the case and the complete power supply are then fitted in, so I'm not quite sure what the problem is here.*
2. Yes, that's correct — you don't *need to solder anything. But, if memory serves, the user* will *need wire strippers and a crimping tool to do a decent job, especially if it's going to be a permanent fixture. Also, I don't recall seeing any insulating sleeves so there'd still be live mains floating around. (This last comment also applies to the earthing of the case, although this would be rather difficult as I can only find a live and neutral in my Spectrum's power supply cable!)*
3. My review case actually came in three parts, although what the third piece was for remains a mystery — perhaps I got an early prototype. I actually said that the "... Transform case was flimsy by comparison". This was a comparative review *and as the only other metal case keyboard was built out of what appeared to be 22 guage mild steel that seemed a fair comparison. The main complaint, though, was that the sample was very poorly finished with several sharp edges and insufficient support for the keyboard.*
4. Every product I test is set up and used thoroughly. Assembly was carried out according to the supplied instructions and the keyboard used for between one and two hours for programming, data entry and game playing. Henry Budgett.

CHRISTMAS COMPLICATIONS

Being a glutton for trivia and glossy pretentiousness, I finger punched the *Xmas Greeting* program from *YS* issue 10 faithfully digit for digit into my aging Spectrum. Surprise, surprise! Instead of marching on in an endless loop, it ground to a halt after one circuit, displaying a 'subscript wrong' message in line 430.

This may easily be corrected by substituting line 440 with the following:

```
440 IF c> LEN m$ THEN
GO TO 420
```

I hope this makes next Christmas a happier time for all your readers.
Andrew Lea, Hereford

Well, that's Tony 'Slim' Samuels for you — ever since he programmed Ugh!, *his mind's been permanently trapped somewhere in prehistoric times. Yes, Andrew, the above correction will certainly work, as will:*
440 IF c=f THEN GO TO 420
Hope it didn't spoil you Xmas too much. Troubleshootin' Pete.

AN ADDITIONAL PROBLEM

Can you advise me on the following problem with my new Spectrum+?

When I entered the routine shown below I got all sorts of different results for zero according to the value in line 30:

```
10 LET S=1
20 PRINT S
30 LET S=S−0.1 (or 0.2 or
   0.5, etc)
40 GO TO 20
```

For example, if line 30 reads 'LET S=S−0.2', I get 4.6566129E −10 and if I change 0.2 to 0.1, I get 6.9849193E−10, and so on.

G Baker, Chesterfield

Sorry Mr Baker, there's nothing we can do, it's just more proof that Sinclair Research could never handle arithmetic too well. Troubleshootin' Pete.

THE END OF



Single Letter Keyword Entry ...
Three Character Fonts ...
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It all began with the ZX80 ...the first personal computer retailing for under £100. Next, Sinclair Research announced the ZX81, offering memory expansion to 16K. Completing the ZX series of micros came the Spectrum and its big brother, the Spectrum+.

Although the hardware has been modified extensively, not much thought has been given to ZX Basic ... and, compared to Basics on many other home computers, ZX Basic is sadly lacking!

Until now, that is! *Your Spectrum* is proud to offer your Spectrum the opportunity to transform itself into a MegaSpectrum. All it needs is *YS MegaBasic* — the inexpensive miracle on cassette.

Professional Computing Power — On A Spectrum

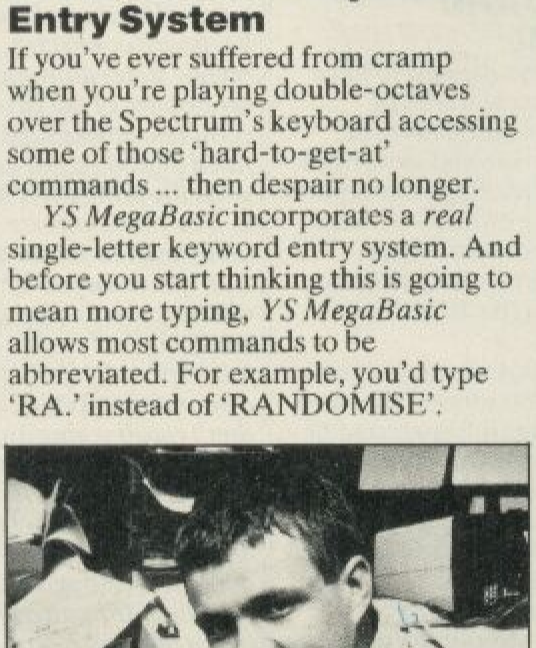
Incorporating many of the best features of Basics found on some of the Spectrum's major rivals (such as the BBC Micro, CBM 64 and Amstrad computers), *YS MegaBasic* gives you the opportunity to unleash power normally associated with machine code!

The program itself uses 19K of RAM, leaving you with 22K to write your own *YS MegaBasic* programs. It may seem as though you've lost a lot of memory, but you'll find you don't need so much code to create on-screen effects with *YS MegaBasic*. Anyway, when was the last time you wrote a program larger than 22K?

At Last! A Real Keyword Entry System

If you've ever suffered from cramp when you're playing double-octaves over the Spectrum's keyboard accessing some of those 'hard-to-get-at' commands ... then despair no longer.

YS MegaBasic incorporates a *real* single-letter keyword entry system. And before you start thinking this is going to mean more typing, *YS MegaBasic* allows most commands to be abbreviated. For example, you'd type 'RA.' instead of 'RANDOMISE'.



The man behind *YS MegaBasic* — Mike Leaman.

KEY FEATURES OF YS MEGABASIC

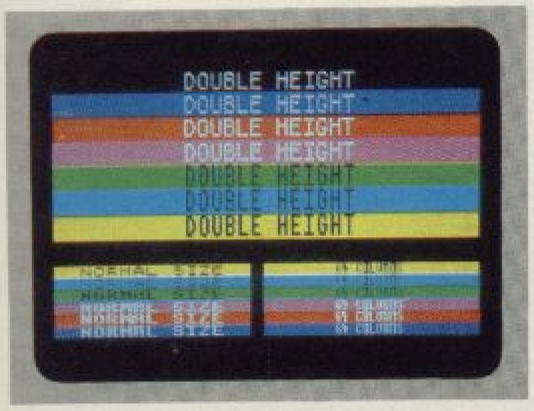
- *An extended command set. YS **MegaBasic** recognises over 35 new commands, which allow you to access the new features available as well as providing the opportunity to make more of the commands in standard ZX Basic.*
- *64 columns of text. Useful for wordprocessing and database applications.*
- *Three character sizes. Using **YS MegaBasic**, you've now the choice of accessing double-height, standard and half-width characters.*
- *Three character fonts. **YS MegaBasic** offers three font styles which allow your Spectrum to mimic other machines on the market.*
- *Windows. You can manage up to six QL-style windows on-screen at any one time.*
- *Sprites. Using the free **Sprite Designer** package that accompanies each copy of **YS MegaBasic**, you'll be able to design and manipulate up to ten sprites on-screen at once!*
- *Enhanced sound. Mike Leaman's taken the Spectrum's BEEP command and given it the full Mega-treatment.*
- *Procedures. Structure your programs and define new commands — it's all here!*
- *Stippled characters. QL-style stipples allow you to mix colours on-screen to give interesting colour effects.*

ZX BASIC?

Sprite Designer — Free With Each Copy Of YS MegaBasic!

Included in the *YS MegaBasic* package, you'll find a special utility program called *Sprite Designer.* Written by Mike Leaman in *YS MegaBasic,* this 11K program is designed to help you create sprites on the Spectrum.

You can have up to ten sprites on-screen at any one time, but if you're careful with memory you can get more!



Here, *YS MegaBasic* is showing off its multifarious character sizes and fonts. Each window contains text in three different sizes: double height, normal height and that used for 64-columns; double height and standard text can be output in three different fonts.



The screen format for the input/output of *YS MegaBasic.* Three windows are provided for input, LISTing and RUNning programs; under software control, each window's size and purpose can be changed to suit individual requirements.

YS MegaBasic

Available only by mail order and only from

Your Spectrum

Your Spectrum, YS MegaBasic
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There's a *YS MegaBasic* coupon already included on this order form and you'll find other coupons in *YS* issues 8, 9, 10 and 11. And they'll be more in future issues ... so no-one will miss out!

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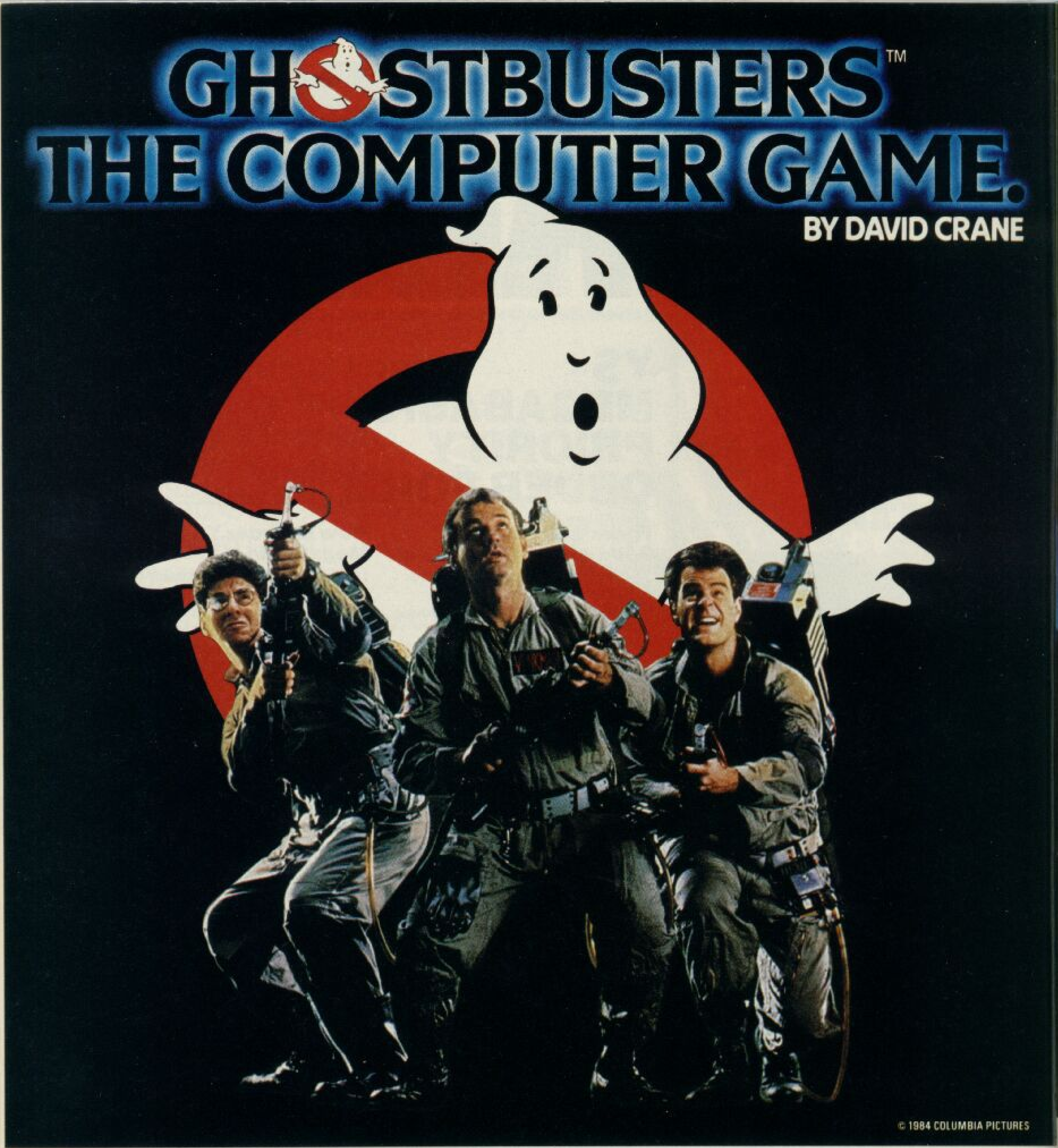
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Using scissors to cut this coupon may prove hazardous to this issue's health. Why not use a photocopy instead?



Yes. Ghostbusters is a computer game, too.

The game play follows the film with incredible accuracy. Even down to the chart-topping music score.

Your task is to rid the world – and in particular New York City – of a cataclysmic plague of ectoplasmic nasties.

Play it well and we give you a Ghostbusters franchise – with your own secret account number. Use this number and the money it brings you, to buy the same ghost busting gear they had in the film. (Don't worry – we'll give you some money to get started.)

You will have earned it. And you can use it to go to undreamed of levels. Don't try to use someone else's number, we'll find out.

From then on, it's you against the ghosts. All the way to the Temple of Zuul.

Where the final battle begins…

Designed by USA's David "Pitfall II and Decathlon" Crane and running on Commodore 64 cassette and disk and Spectrum. Coming soon on other systems.

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TUNING UP!

ZX Spectrums may not be the most musical of micros . . . but, if you're like Chris Somerville, you're not exactly a Beethoven in the making anyway! So, compose yourself for the musically illiterate's guide to writing music . . .

Apart from enhancing the variety of zaps and zings which accompany alien annihilation, the Spectrum BEEP commands can be used quite effectively to produce simple tunes and jingles; witness the somewhat over-used 'Funeral March' that signifies failure in many commercial programs.

Of course, you could always call suitable snippets of music from sheet music for your own programs — these are often available for a few pence from a local secondhand bookshop. But this is where the catch comes in! The musical notation has to be translated into the numerical pitch and tempo required by the Spectrum. Fine if you can read music, especially as a number of commercial programs allow you to use the Spectrum as a sort of piano keyboard. But if you can't read music . . .

NOTA BENE

Very few programmers can claim to be conversant with musical notation but anyone could, by laboriously counting lines and spaces, work out the individual notes. This program allows leisurely entry of each note as a musical letter, followed by a number to signify the duration of that note. You can even indicate the use of a sharp or flat!

Musical notation generally conveys two pieces of information: the pitch of each sound and how long it should last. Although it may look confusing it's really not that difficult to translate.

The pitch of a note is shown by its position on a stave, which is a row of five lines; notes can be placed on a line, or in the space between two lines. Take a look at the diagrams provided and you should be able to figure out which note is which in most any sheet music you can find. Of course, there are one or two things to watch out for. For example, to make a note higher or lower, you'll find that the composer has introduced a sharp (#) or a flat (♭) respectively. If these symbols appear next to an individual note, then it must be altered appropriately; if, however, the sharp or flat symbol appears at the very beginning of the stave, *all* the notes on that particular line, or in the space, should be altered. You'll also find that there are a number of different shaped notes, each offering varying length notes; there's a separate diagram showing all the

Here's the listing of Chris' program, *Music Writer*. Please note that due to our capitalist printer, hash signs (#) have been printed up as sterling signs (£).

```
 10 RESTORE
 20 DATA 0,56,68,130,68,56,0,0
 30 DATA 8,8,8,56,72,136,144,96
 40 DATA 8,8,8,56,120,248,240,9
6
 50 DATA 14,8,8,56,120,248,240,
96
 60 DATA 14,8,14,56,120,248,240
,96
 70 FOR i=USR "a" TO USR "e"+7:
 READ c: POKE i,c: NEXT i
```

Lines 10-70 Set up the graphics for the program.

```
 80 LET oct=0: LET tempo=16
 90 DATA "a%","a ","a£","b%","b
","c","c£","d%","d","d£","e%","e
","f","f£","g%","g","g£"
 100 DATA -4,-3,-2,-2,-1,0,1,1,2
,3,3,4,5,6,6,7,8
 110 DATA "A%","A","A£","B%","B"
,"C","C£","D%","D","D£","E%","E"
,"F","F£","G%","G","G£"
 120 DATA 8,9,10,10,11,12,13,13,
14,15,15,16,17,18,18,19,20
 130 DIM a$(34,2): DIM a(34)
 140 FOR i=1 TO 17: READ a$(i):
NEXT i
 150 FOR i=1 TO 17: READ a(i): N
EXT i
 160 FOR i=18 TO 34: READ a$(i):
 NEXT i
 170 FOR i=18 TO 34: READ a(i):
NEXT i
 180 GO TO 500
```

Lines 80-180 Initialise the variables.

```
 200 CLS : PRINT '"  YOU CAN ENT
ER NOTES WITHIN            TWO
OCTAVES": PRINT '"  a b c d e f
g A B C D E F G"
 210 PRINT '" Enter each note as
 a letter,     which may be follo
wed by:       £ for Sharp or % f
or Flat": PRINT '" After each no
te you will be      asked to ente
r the note length  which should
be a number:": PRINT '"     1
 2     4     8     16     e
 d     c     b     a"
 220  PRINT ''" When all notes h
ave been          entered you shou
ld enter ""end"""
 230 LET n$="": LET t$=""
 240 INPUT "NOTE or END";i$: IF
i$="" THEN  GO TO 240
 250 IF i$="end" OR i$="END" THE
N  GO TO 370
 260 IF LEN i$=2 THEN  IF i$(2)<
>"%" AND i$(2)<>"£" THEN  BEEP .
5, 5: GO TO 240
 270 IF CODE i$<65 OR CODE i$>71
 AND CODE i$<97 OR CODE i$>103 T
HEN  BEEP .5,-5: GO TO 240
 280 IF i$="b£" OR i$="c%" OR i$
="e£" OR i$="f%" THEN  BEEP .5,-
5: GO TO 240
 290 IF i$="B£" OR i$="C%" OR i$
="E£" OR i$="F%" THEN  BEEP .5,-
5: GO TO 240
 300 BEEP .1,19: BEEP .1,12
 310 INPUT "LENGTH OF NOTE";j$:
IF j$="" THEN  GO TO 310
 320 IF CODE j$<49 OR CODE j$>59
 THEN  BEEP .5,-5: GO TO 310
 330 BEEP .1,19: BEEP .1,12
 340 IF LEN i$=1 THEN  LET i$=i$
+" "
 350 IF LEN j$=1 THEN  LET j$="0
"+j$
 360 LET t$=t$+j$: LET n$=n$+i$:
 GO TO 240
 370 CLS : PRINT AT 10,10; FLASH
 1;"PLEASE WAIT": LET t$=t$+" "
 380 LET p$="": FOR i=1 TO LEN n
$ STEP 2: FOR j=1 TO 34: IF n$(i
 390 LET k$=STR$ a(j): IF LEN k$
=1 THEN  LET k$="+"+k$
 TO i+1)<>a$(j) THEN  NEXT j
 400 LET p$=p$+k$+t$( TO 2): LET
 t$=t$(3 TO )
 410 NEXT i
 420 LET q$=""
 430 FOR i=1 TO LEN p$
 440 LET q$=q$+p$(i): NEXT i
 450 RETURN
```

Lines 200-450 Comprise the input subroutine. Full instructions for the input of the musical data are provided as on-screen instructions.

```
 470 FOR i=1 TO (LEN q$)-3 STEP
4
 480 LET d=VAL q$(i+2 TO i+3): L
ET p=VAL q$(i TO i+1): BEEP d/te
mpo,p+oct
 490 NEXT i: RETURN
```

Lines 470-490 This routine plays back the tune you've input.

```
 510 CLS : PRINT "
MENU
"
 520 PRINT '"  1)  ENTER A TUNE"
 530 PRINT '"  2)  PLAY THE TUNE"
 540 PRINT '"  3)  PLAY AN OCTAVE
 HIGHER"
 550 PRINT '"  4)  PLAY AN OCTAVE
 LOWER"
 560 PRINT '"  5)  INCREASE TEMPO
"
 570 PRINT '"  6)  DECREASE TEMPO
"
 580 PRINT '"  7)  PRINT DATA"
 590 PRINT '"  8)  RESET OCTAVE &
 TEMPO"
 600 IF INKEY$<>"" THEN  GO TO 6
00
 610 LET i$=INKEY$: IF i$="" THE
N  GO TO 610
 620 IF CODE i$<49 OR CODE i$>56
 THEN  GO TO 600
 630 IF i$="8" THEN  LET tempo=1
6: LET oct=0: GO TO 500
 640 GO SUB (190 AND i$="1")+(46
0 AND i$="2")+(660 AND i$="3")+(
670 AND i$="4")+(680 AND i$="5")
+(690 AND i$="6")+(700 AND i$="7
")
 650 CLS : GO TO 510
```

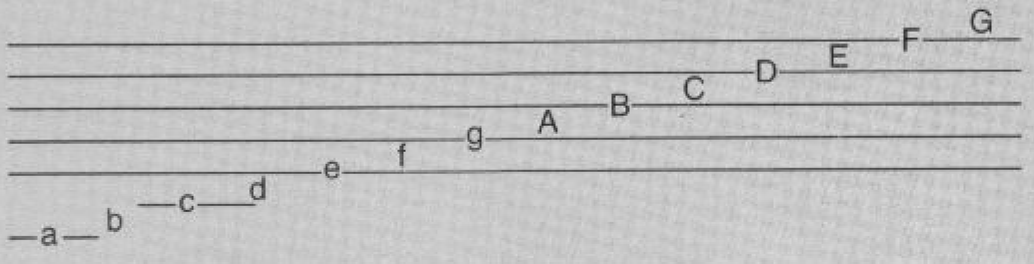
Lines 510-650 Provide the on-screen menu of eight options you're greeted with once you've booted the program. Choose an option and this routine will send the program flow to the subroutines in lines 660-800.

```
 660 LET oct=oct+(12 AND oct<=49
): GO SUB 470: RETURN
 670 LET oct=oct-(12 AND oct>=-3
3): GO SUB 470: RETURN
 680 LET tempo=tempo+2: GO SUB 4
70: RETURN
 690 LET tempo=tempo-1 AND tempo
>1: GO SUB 470: RETURN
 700 CLS : FOR i=1 TO LEN q$-3 S
TEP 4
 710 LET d=VAL q$(i+2 TO i+3): L
ET p=VAL q$(i TO i+1): PRINT "BE
EP ";d/tempo;",";p+oct;":";
 720 IF PEEK 23689=4 THEN  GO SU
B 750
 730 NEXT i
 740 GO SUB 750: RETURN
 750 PRINT AT 21,0;" SEND TO PRI
NTER Y(yes) N(no)"
 760 IF INKEY$<>"" THEN  GO TO 7
60
 770 LET i$=INKEY$: IF i$="" THE
N  GO TO 770
 780 IF i$="y" OR i$="Y" THEN  C
OPY : CLS : RETURN
 790 POKE 23692,255: RETURN
 800 SAVE "music" LINE 10
```

Lines 660-800 Contain the subroutines for the options available on the menu screen.

THE ART OF NOISE!

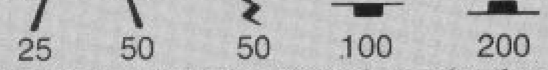
Once you've RUN Chris' *Music Writer* program, you're greeted with a menu offering eight options: to create a tune, to play the tune back through the Spectrum, to raise/lower the octave, to increase/decrease the tempo, to print out the data for the tune, and to reset the octave/tempo. So, let's take it from the top and transcribe a tune . . .



First off, you'll need to lay your hands on some sheet music. Now take a look at the illustration above and you should be able to transcribe each note on the sheet music into a letter 'a' to 'g' or 'A' to 'G'; initially, 'c' is set to middle C — but you've always got the option of altering the octave once you've completed all the fiddly bits. Notes are entered with a letter first; if you're required to enter sharp (#) or flat (♭) notes, you must tag each letter with a '#' symbol for a sharp or a '%' for a flat.



Once you've input the letter of the particular note by pressing the Enter key, you'll be asked for the duration of the note. The Spectrum is expecting a number from the diagram above — simply match up the note with the one on the music sheet and type it in. Once you've got the tune safely into the Spectrum's memory, you can use the 'playback' option to hear what you've got. If you're not satisfied with the output, you've got four options to speed it up or slow it down, or change the octave it's been written in. Then, if you want, you can print out the list of BEEP statements on your printer for future use in other programs.



Musical rests can't be simulated in this program but, using the suggested PAUSE values for the rest symbols shown above, you can insert the necessary PAUSE statements once you're sure that the rest of the melody is as you want it.

musical notation you'll need to master.

Unfortunately, this program can't deal with musical pauses. However, these *can* be included as PAUSE commands in between the BEEP commands when you transcribe the program for future use. Since the PAUSE command works in fiftieths of a second, its duration number can't be in the same range as used for BEEP. However, provided with this article you'll find a table illustrating the various musical rest symbols and the corresponding PAUSE duration.

Most music is written within two sets of five lines — the upper stave carrying the melody and the lower stave containing the accompaniment. Since the Spectrum can only cope with one note at a time (*Unless you're Sandy White, of course! Ed.*) you'd be best advised to stick with the melody only.

ON A FINAL NOTE

Anyone who's had any formal musical training will probably be experiencing an extreme case of the vapours by now. Yes, I know it's cheating — but for readers who want to 'SingalongaSpectrum', well, this could be your only chance. Armed with this program and the 'oh so brief' guide to reading music, you should be able to transcribe any sheet music.

A word of advice though; before you start converting Beethoven's *Fifth* for the Spectrum, don't be tempted to add too much sound to your program — generally a recognisable snippet will do. You only need to set the scene and you'll find that a five second blast of an old familiar tune will be a lot more successful than a long tune that keeps repeating. YS

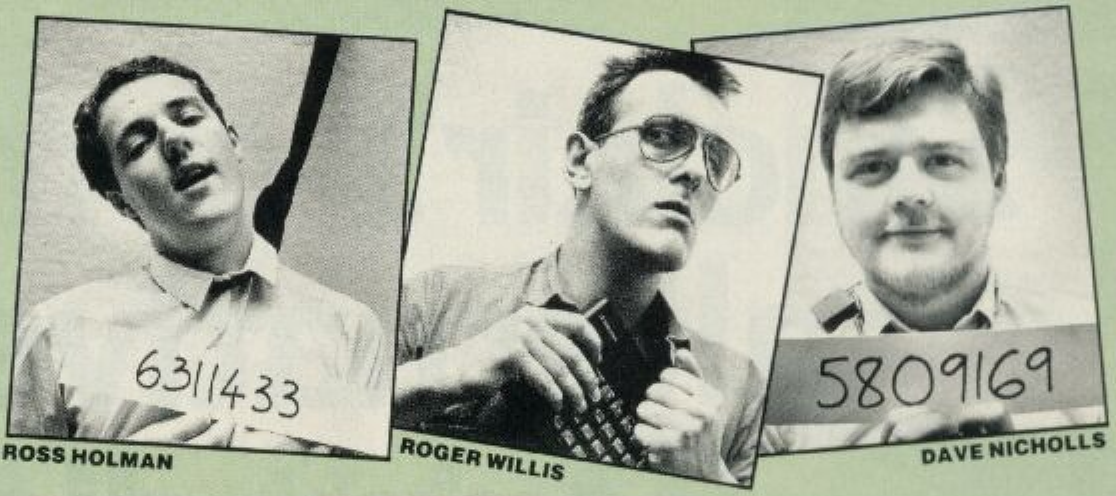

SON OF
BLAGGER
NSHQ
EXIT

JOYSTICK JURY

From their bench on high, our regular panel of jurors — Ross Holman, Dave Nicholls and Roger Willis — pass judgement on the latest games software!

You're probably getting used to our joystick jockeys by now but, for the record, there's gamester supremo Ross Holman; the hairiest of hackers, Dave Nicholls; and the fastest reviewer on two wheels, Roger Willis.

WARNING!
Just in case you find our scoring system too confusing, here's what it's all about. The score out of five at the end of each person's review is based on their own experience of the game. But that's pretty subjective . . . so they also use the HIT and MISS system to indicate its potential as a commercial success.



ROSS HOLMAN ROGER WILLIS DAVE NICHOLLS



SKOOL DAZE
Microsphere/£5.95

Ross: In *Skool Daze* you get a chance to re-live your youth or, as in my own case, do all those things you didn't dare do!

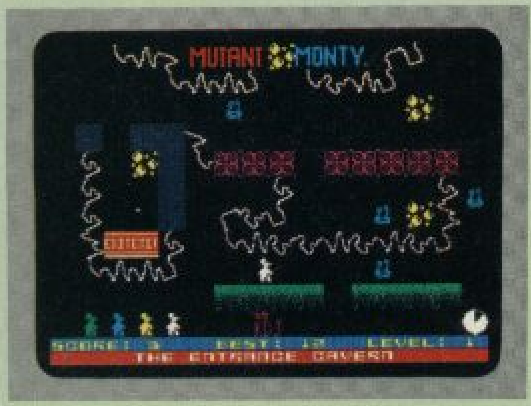
You play Eric, and if you want to be able to sit down for the next week, you must retrieve your school report from the safe before your parents get to see it. The first thing to do is to hit all the shields hanging on the walls. This in itself is not so easy and may require using one of the other boys as a spring-board, or even deflecting one of your catapult pellets off a teacher! Once all the shields have been hit the masters can be persuaded to reveal their letter to the safe's four-part combination.

Eric and the other children can go to any room but *must* obey the bell which signals the start of lessons.

The graphics are very clear and well animated, and the independence of all the other characters makes the game fun to watch. However I didn't really find that I wanted to play it for very long. It is, nevertheless, a *very* clever piece of software. *3/5* **HIT**

Dave: This is a very original game with good graphics. The playing area isn't very big, and it does seem rather unfair that if you go to a lesson where there aren't enough seats you get lines every time you get pushed out of your seat. I want my Mummy! *3/5* **HIT**

Roger: Buy now — before Sir Keith Joseph has it banned! This is as near to the *real thing* as I'm prepared to get. If you're still at school, learn and inwardly digest . . . *4/5* **HIT**



MUTANT MONTY
Artic Software/£6.95

Ross: If you were going to write a piece of software but couldn't think of an original idea then you might end up doing what everybody else seems to have done . . . and that's to borrow a bit of inspiration from *Manic Miner* or *Jet Set Willy.*

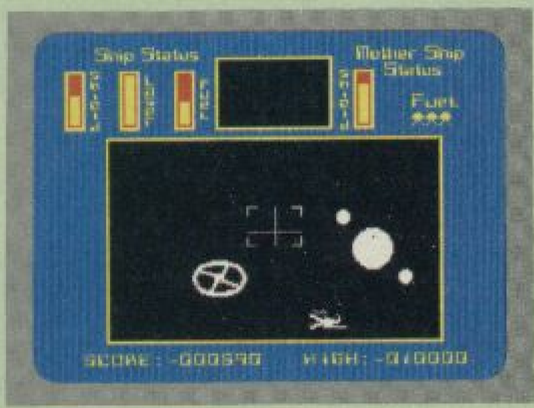
The game itself has 40 screens, each of which has a name and a number of pieces of gold to collect. Monty (a similar character to Miner Willy) moves left, right, up and down, and has to career around the screen dodging the horizontally or vertically moving graphics. The lack of jumping ability means that this is not a true platform game.

Despite its many familiar features, *Mutant Monty* does have a few things going for it. Firstly, Monty accelerates when moving left and right if you keep the key held down and will continue to move until you press another key. This means that avoiding the nasties is a little more tricky than your average game. Secondly, the sprites move and animate smoothly.

The screens are all very colourful and lively, but unless you're a real fan of this kind of game it offers nothing new. *2½/5* **MISS**

Dave: Reasonable graphics, but the controls seemed rather slow to react. After wandering around so many games like this and collecting gold, I should be a rich man — where am I going wrong? *2/5* **HIT**

Roger: Forty-seven cans of *Special Brew* and a blindfold might prepare you for staggering through Monty's many rooms in an imprecise and frustrating quest for gold. But I suppose any ol' anaesthetic will do! *2/5* **MISS**



CYLON ATTACK
A 'n' F Software/£5.75

Roger: Having always thought that 'Cylon' was something they made cheap shirts out of, I was disagreeably surprised to find it cropping up as yet another alien life form. Here we go again, striving to protect the wholesomeness of one's mother ship.

Launch and landing sequences, and on-screen instrumentation (including radar and cockpit sights) complement protective screens and lasers that gradually expire from over-exposure to malevolent cheap shirts. As one would expect, these garments are cleverly disguised as spacecraft, getting bigger as they get nearer.

That, more or less, explains the pretension towards 3D graphics, in which case I can only wish there were more — dimensions, that is. Such a facility would at least allow me to exploit the space/time continuum and slip off for a swift half whilst Spectrum and Cylons play 'shootie-bangs'. Computers have no feelings. Neither have shirts. *1/5* **MISS**

Ross: This didn't quite live up to my hopes that it would be a good 'blast everything that moves' game, but it wasn't that bad. *2/5* **MISS**

Dave: Nice, big, smooth graphics are the main feature of this game. I didn't find it very addictive, but 'shoot 'em up' fans might think it's fun. The background graphics are great. *3/5* **HIT**

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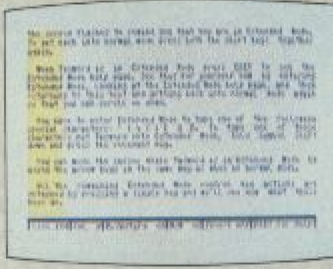
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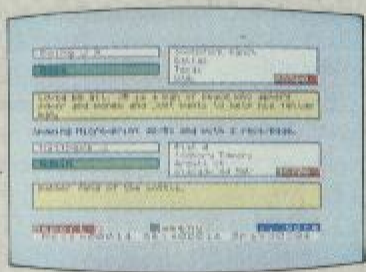
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JOYSTICK JURY



STRONTIUM DOG — THE KILLING

Quicksilva/£6.95

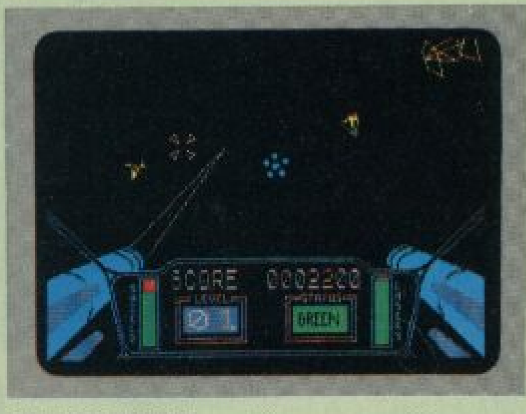
Roger: Johnny Alpha is a 'Search And Destroy' agent (a mutant bounty hunter of the future) who first appeared in yer actual *2000AD* comic and he may well have been the star of many ripping yarns in those smudged and inky pages. His dubut, however, as Sinclair superheroette is somewhat more than underwhelming. It's desperate! It's a dog's life!!

You can poodle the Strontium woofer through a generally doggy selection of extraterrestial kennels, seeking 'vicious murderers' who need to be put permanently too sleep, along with the 'Evil Dictators' who apparently control this contest of yapping yawns. Watch out for the 'Steel Kriegs' too!

Owing to a blatant programming oversight, Strontium Dog fails to cross his back legs in frustration and agony at the complete absence of life-relieving lamposts unfolds screen by screen. Maybe they were just hard to find in two dimensions? *2/5* **MISS**

Ross: Here we have another complex maze of rooms within which you wander aimlessly! Occasionally, you come across a 'nasty' to blast, but otherwise there's very little to do. Tedious stuff. *1/5* **MISS**

Dave: 'The Killing' is an apt name for this game — while playing it, I nearly died of boredom! Games seem to be getting bigger and bigger, but with less and less content! *1/5* **MISS**



STARSTRIKE

Real-Time Software/£5.95

Ross: About two years ago I first saw a game called *Star Wars* in the arcades and looked forward to the day when I'd be able to play such a game in the comfort of my own home. Well, that day's here as it's now available on the Spectrum.

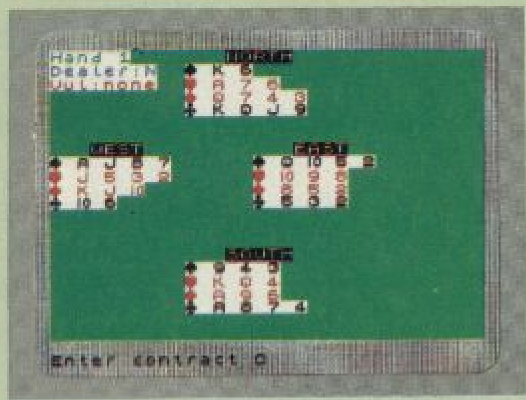
Starstrike has three stages; the first finds you out in space in control of a fighter under attack from various alien craft; the second stage involves you shooting the gun emplacements and towers on the alien moon; and third stage is in a trench (à la Deathstar) where you must avoid the bridges that cross it and shoot out more gun emplacements.

Your fighter is protected by a shield which decreases in strength each time it gets hit by the alien.

Like *Dark Star* this game pushes the Spectrum to the limits with some very fast line drawing routines. However, unlike *Dark Star, Starstrike* manages to maintain its playability. The speed sometimes suffers if you shoot a lot of things at once, but the 3D simulation and crisp response to any adjustments in your flightpath is superb. *4/5* **HIT**

Dave: At last, *Star Wars* on the Spectrum — and a pretty good version at that! The graphics are great, especially the alien moon trench, but they do slow down quite a bit when there's a lot going on. *3½/5* **HIT**

Roger: Suddenly, it says here, there were the (gasp) Outsiders! Suddenly (yawn), I fell — completely and unsurprisingly — into a deep slumber for the duration of this game. *1/5* **MISS**



BRIDGE PLAYER 2

CP Software/£9.95

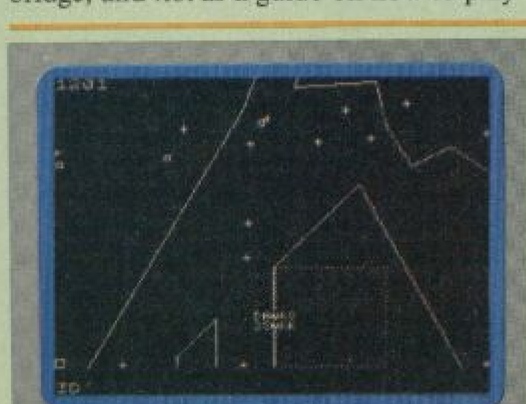
Ross: *Bridge Player 2* is intended as an aid for those wishing to practise playing bridge, and *not* as a guide on how to play the game. The accompanying manual describes all the features of the program, but does tend to slip into *'Bridge* jargon'; having said that, though, I'm far from a hardened *Bridge* player and I could still understand most of the finer points!

The program works by dealing the pack to all four hands, but there is the restriction that no more than eight cards of one suit can appear in one hand; this is due to the graphical layout of the cards on-screen. Once dealt, the bidding begins and follows the Acol system, with commands such as '5C' being interpreted as a bid of five clubs; however, as the human player, you always play south and enter the card you wish to play with the suit first and then its value. Some nice refinements are the automatic play of cards if you have only one legal response, and hitting the Enter key to play the lowest card when following suit.

The graphical display is clear and easy to follow, and the computer plays very reasonably. This will not appeal to the masses, but it's worth trying if you want to become the *Bridge* equivalent of the Cincinatti Kid. *3/5* **MISS**

Dave: Hah! Hands up who thought this was a sophisticated platform game. I'm not that good at *Bridge* but, after playing this package for a while, I think I'm a bit better . . . *4/5* **MISS**

Roger: I'd have preferred something a little more racy . . . maybe, Spectrum poker! Generally, though card games are a sunset industry. *1/5* **MISS**



AIR TRAFFIC CONTROL

Mikro-Gen/£9.95

Dave: "Oh no! I've lost contact with that 737 heading for Heathrow, and the outward bound DC10 has lost pressurisation so I'll have to re-route all the aircraft down W17 and put Concorde in a holding pattern, then I can . . ." This is an example of the thoughts that go through your head as you play (!!) Mikro-Gen's *ATC.*

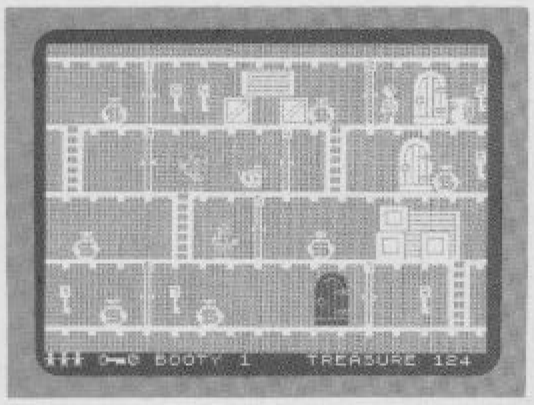
The program simulates the job of controlling the air traffic over a section of southern England, including the main London and south coast airports. All you have to do is make sure the planes don't get too close together and that aircraft leaving your section are at the correct height for the air channels they're entering. You take over for a fixed period of one hour and, at the end (or earlier if you quit), you're given a percentage rating relating to your performance. Different ability levels are catered for by varying the number of planes entering the area within the hour.

Communication with the planes is handled via the keyboard and the main screen display depicts your radar screen; you can also have on-screen lists of aircraft or all flights scheduled to come through the area.

ATC won't be everyone's cup of tea, but if you like simulations or turning your brain to jelly then it's worth a look. *4/5* **MISS**

Ross: Because this game's such an accurate simulation of air traffic control, it's rather slow and dull. No doubt some of you out there are dying to be master of the skyways, but it's certainly not my idea of fun! *1/5* **MISS**

Roger: Such a staggeringly boring and witless simulation that it'll probably go *nova* in Guildford and be even bigger in Woking . . . *0/5* **MISS**



BOOTY

Firebird Software/£2.50

Dave: Booty is a platform game in which you have to move around in the hold of the Black Galleon collecting — not surprisingly — booty. There are 20 holds to empty and, when all have been cleared, you have just 45 seconds to find the key to the next section. Hazards in the game include deadly parrots, ghost pirates and exploding treasure.

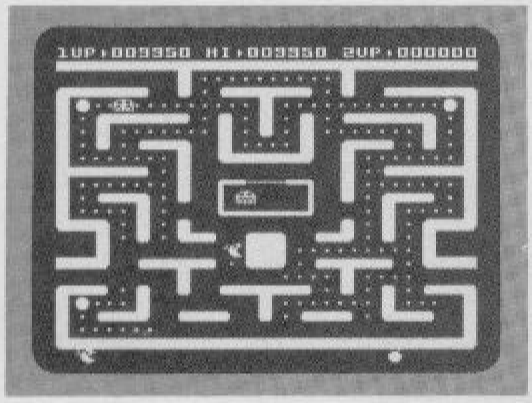
Each screen has a number of doors (some of which lead to alternate holds and others which simply get in the way) and there are various numbered keys lying around which can be used to open the corresponding door.

Music plays throughout the game but can be switched off when it gets too annoying. However, now we're onto the annoying features. The thing that really bugged me was that when you die you always return to the first hold.

For the price, *Booty* is *very* good value, but it does rather lack addictivity. *2½/5* **HIT**

Ross: This represents good value for money. It requires a slightly different approach to other 'ladder and levels' games — but I still didn't find it that compelling. *2/5* **MISS**

Roger: If only my daily life had 'doors' to escape into the next screen . . . but cabin boy 'Jim' has to cope with parrots that bode terminal illness reminiscent of the Inland Revenue on heat . . . *3/5* **HIT**



MS PACMAN

Atarisoft/£9.95

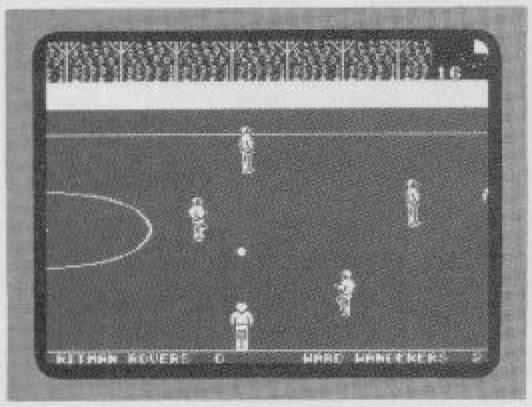
Roger: As the Greater London Council and page seven of *The Guardian* never cease to remind us, God was obviously a woman. And so, we are now told, was the 'Original Atari Arcade Classic.

However, before your imagination's run riot, there's not a 'lady bump' in sight. Which is surprising really since she must be bursting out all over, considering her diet of interminable dots, intermittent fruit and interestingly aggressive energy pills. But never mind, because fat is, after all, an acceptably feminist issue.

What started out as a simple screen for simple minds can be viewed through playground perspectives by pageboys or sucked dry of innuendo cred by Page Three readers. After all, pills that can be consumed prior to the termination of blinking phantom breath have got to be twinning the jolly old *entendres*, haven't they? Ignore this intellectual flatulence. *Ms Pacperson* is a seminal and shapely (oops!) figure in micro software history. Put her in the display case next to your mainframe! *5/5* **HIT**

Ross: Surprisingly, this offering from Atarisoft is much better value and a superior program to its original Pacman! *3/5* **MISS**

Dave: I loved Pacman when it first came out, and I'm sure I'd have loved this one — if only Atarisoft had changed a little more than Pacman's sex! *2/5* **MISS**



MATCH DAY

Ocean/£7.95

Dave: *International Soccer* has been available on the Commodore 64 (*Wash your mouth out with soap! Ed.*) for some time and has proved popular . . . especially in Dixons' shop windows! Well *Match Day* is basically the same game.

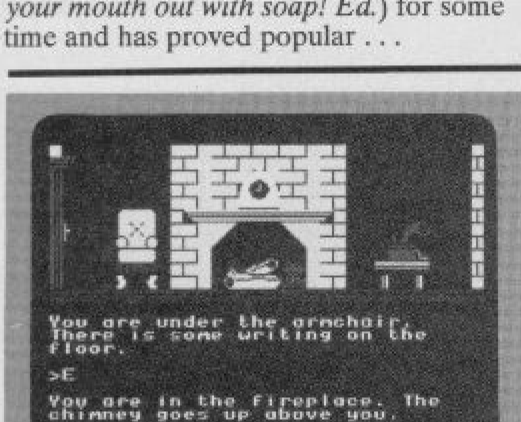
For those who haven't seen it, this is a football game where you have a 'camera's eye' view of the pitch on which two teams — either both player controlled or where you get to pit your boots against the computer — battle it out. You only control one team member at a time, while the others in your team run about and try to get into the best positions under computer control. If one of your players has the ball, then you get to control the player in possession; if you've got the ball, the Spectrum puts you in control of the player best positioned to intercept.

If the opposing side shoots for goal then you get control of your goalie and you can make him jump up or dive left or right. Set pieces, like corners and throw-ins, are handled automatically with your players positioning themselves; if it's your corner or throw-in, then you've nine options for the direction/strength of the throw/kick.

I hate football — but I loved this game and I'm quietly confident that it will be a hit. *5/5* **HIT**

Ross: The large graphics animate nicely, especially the goalkeeper who kneels up briefly after a dive and looks around for the ball. A fun game with a good degree of skill needed if you want to win the cup. *4/5* **HIT**

Roger: Unrealistic, in that it lacks violent crowd invasions of the pitch and vicious, leg-breaking fouls whilst the ref ain't looking. Still good enough to make Jimmy Hill mix his metaphors . . . *4/5* **HIT**



THE WITCH'S CAULDRON

Mikro-Gen/£6.95

Ross: Mikro-Gen are producing some very good pieces of software these days, and this text and graphic adventure is no exception. In the best of fairy-tale traditions, the plot is based on a Prince who having been turned into a toad, is now trying to regain his regal form.

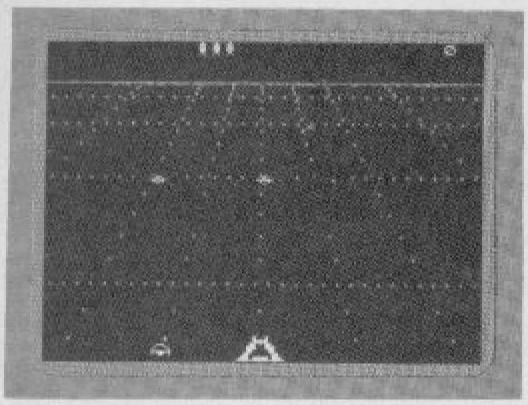
The wicked witch, Hazel, cast the spell that transformed the Prince, and it's her abode that you have to hop around collecting all the ingredients necessary to make a potion in the witch's cauldron and then drink it. On your travels you may turn into many other forms, which can be useful but can also make you vulnerable to attack; for example, try turning from a toad into a bat and you'll be eaten by the cat.

I'm not a great fan of adventures but I liked this one very much. The illustrations of each room (which appear at the top of the screen) are detailed and drawn quickly, and the idea of the toad moving about the picture as you give it instructions is quite novel. Above all, this adventure is very user-friendly; it understood most of what I typed in and didn't expect that strange dialect I call 'adventure-speak'.

Overall, a humourous and well-designed game that I'd recommend highly. *3/5* **HIT**

Dave: Being able to see yourself moving around on-screen is a nice touch, but then there's lots of humour in this game. Red herrings abound and the puzzles are more than difficult. Addictive enough to keep you hopping back for more. *3½/5* **HIT**

Roger: One for the pot — in that any literate, difficult, but somewhat sluggardly, cerebral adventure game can earn its supernatural keep. *3/5* **HIT**



BEAMRIDER
Activision/£7.99

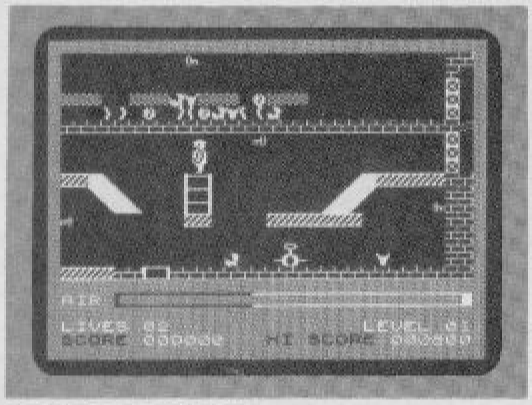
Dave: Beamrider is a 'skim the surface of the planet (or, in this case, Restrictor Shield) shooting things that appear over the horizon' game. There are few other games of this type around and, I'm afraid *Beamrider* is nothing really very special. That said, it's an above average 'Zap 'em' with quite a lot going on . . .

In order to progress up through the screens, you have to shoot 15 of the flying saucers that come down the grid, but there are several other types of alien flying around which sometimes get in the way. Some of the aliens can be destroyed with your 'laser lariats', but others can only be blown up by a torpedo. As you only get three torpedoes and you need at least one to destroy the sentinel ship that appears at the end of each screen, I found myself dodging more often than shooting. Different meanies appear on the higher screens and, by about sector seven, you'll find yourself very busy indeed!

If you're looking for a fast shooting game, then *Beamrider* is probably worth a look — but it's not exactly state-of-the-art stuff. *2/5* **MISS**

Ross: This is a very 'old' game . . . and it shows! The different behaviour displayed by the nasties and the hectic pace of the game on the higher levels make this a reasonable 'zap and blast' game. It does however, have rather a short-lived appeal. *2/5* **MISS**

Roger: Clearing the sinister Restrictor Shield that surrounds one's planet is about as vibrant as outgrowing the brace on one's teeth. *1/5* **MISS**



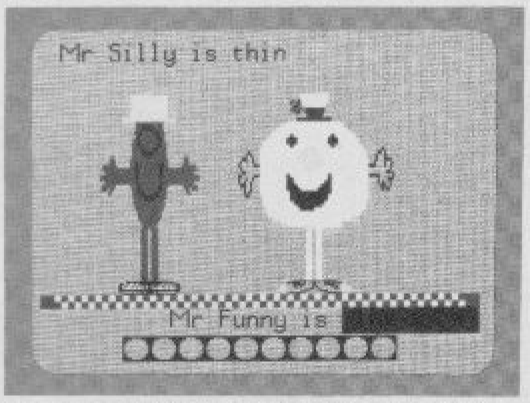
SON OF BLAGGER
Alligata Software/£5.95

Roger: When you've finally managed to keep the Blagger loaded by persuading this program that you *have* actually entered the correct master anti-piracy code deduced from straining peepers at a miniscule key on the packaging, disappointment soon follows . . .

Son Of Blagger ain't just another platform game — it's a bad platform game. Less-than-witty graphics are notable only for their crudity, abetting annoyingly erratic control of the Blagger himself. As he hops, jumps and creeps around the two-dimensional scrolling screens of Spectrum Security HQ, our boy is expected to scarper out of each room with all the 'hidden' gold keys before exhaustion of limited air supply. Quite what he's supposed to do with a binful of such upmarket locksmith's accoutrements, I don't know . . . not having hung around to find out. Do yourself a favour and blagg a better game than this! *1/5* **MISS**

Ross: It's nice to see a scrolling *Manic Miner* type game — after all, they're really popular on the CBM 64 and BBC Micro. Catching the occasional brief glimpse of an as yet unreached area can make the game that much more interesting! *2/5* **MISS**

Dave: I found movement on-screen a little sluggish, and play was a bit boring. However, the scrolling techniques used are clever. *2/5* **MISS**



WORD GAMES WITH THE MR MEN
Mirrorsoft/£9.95

Dave: This is one of a series of educational programs. Included in the package are two cassettes (one for each game), an explanatory booklet, and a plastic keyboard overlay which covers the alphabet keys and masks off the Spectrum keywords.

The package is aimed at five to eight year-olds; to be realistic though, it's more likely to appeal to children at the lower end of the scale.

On the first cassette is *Mr Noisy's Word Game,* which is designed to teach words like 'small', 'wide', 'smallest' and 'widest'. There are nine different games to play, each of which can be selected from the main menu.

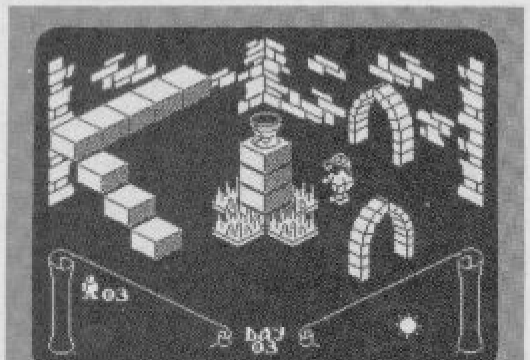
Other games allow various combinations of reading and writing exercises ranging from matching up a picture with the correct word to choosing the opposite to a displayed word.

The second cassette contains *Read With Mr Bounce,* which teaches position words like 'above', 'inside', and 'on'. Again, there are several different options to teach different uses of the words.

The graphics are large and clear, and this is just about the best educational package I've seen on the Spectrum. *5/5* **HIT**

Ross: The colourful screen layout and large, well animated graphics make this series of educational games very appealing. The pupil is lead through a number of increasingly difficult tasks, from single key answers to full sentences. A very good educational package. *3/5* **MISS**

Roger: A vital training aid for the *illiterati* scribbling in this rag. *Your Spectrum* rumours allege that it constitutes Troubleshootin' Pete's favourite screentime! *5/5* **HIT**



KNIGHTLORE
Ultimate/£9.95

Roger: Beginning life as some sort of gothic Noddy, the quest through Melkhior's castle is frequently interrupted by one's temporary transformation into a werewulf, which is what, *ultimately* . . . (groan) . . . this superior escapade is all about. In a mere on-screen 40 days and 40 nights, your canine metamorphosis will become tragically permanent and the game will be up in all possible senses. Better get moving, eh?

Splendid isometrically-projected 3D cartoon participants and hazardous, but cleverly defined, rooms demonstrate how this program leaves most of the rest in a technical Dark Age. Despite my getting somewhat chunderesque about these programming chaps who even blow their noses in machine code remaining unimaginatively fascinated by Sword'n'Sorcery plots, this remains one slice of mysticism that isn't stale.

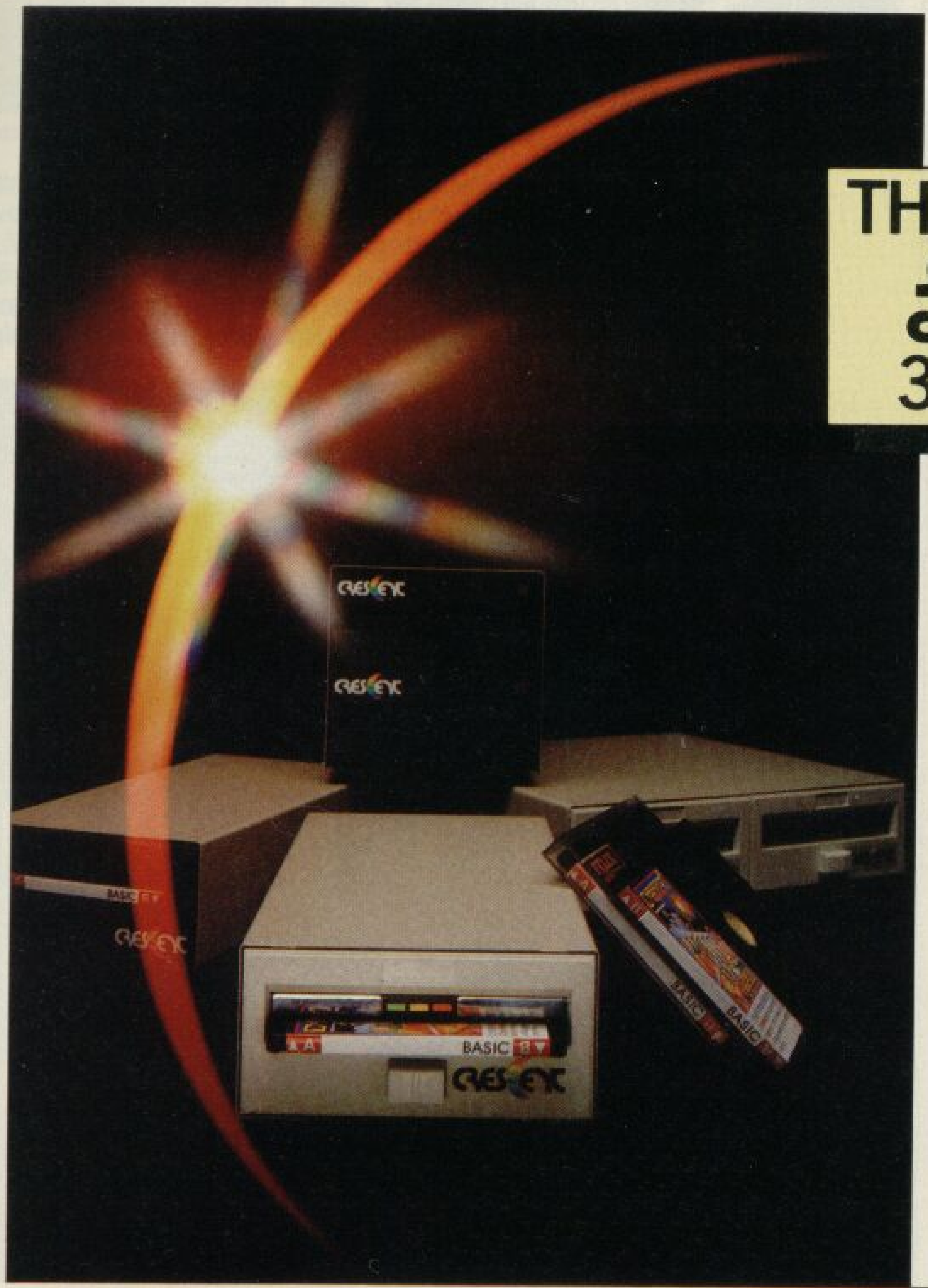
I'll personally front up with a bottle of fizzy 'falling-over' pop for the first infinite lives POKE — so that I can actually survive for more than my current appalling 8% of the total cataclysmic content. *5/5* **HIT**

Dave: Ultimate shows no sign of stagnating and producing duff games — in fact, the games get better and better. *Knightlore* is original, playable and has superb graphics. Show it to your Atari/Commodore-owning friends and turn 'em green! *5/5* **HIT**

Ross: What can you say about Ultimate when it comes up with software as good as this! The graphics are second to none and the other characters in the game seem to have a life of their own. *4/5* **HIT**



Written and drawn by Hunt Emerson



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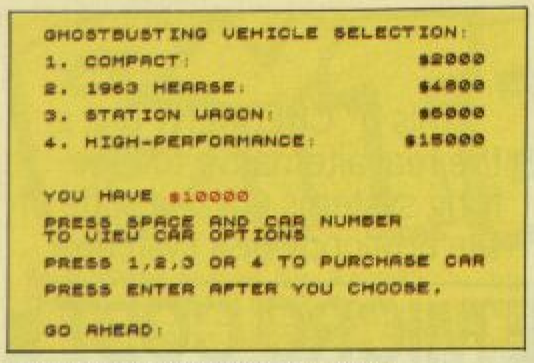
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HEY, ANYONE S

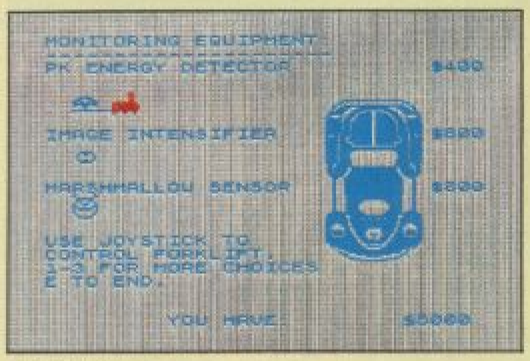
What better way to guarantee a successful software pack
'gone down a storm', before wading in with your own pro
— the movie — began its successful sweep of this cou
computer game for the CBM 64. Now, after the 'Ghostbus
the game has appeared — but, as Ross Holman and Dav
panache of the CBM version. Messrs Holman and

1



"Professional paranormal investigations and eliminations..."
That's the aim of the game. You're given a $10,000 loan to start your franchise, and the first thing you need is a decent set of wheels. The vehicle and equipment selection stages of the game are done well, although they do lack the variety of colours available on the Spectrum ... and the tele-typewriter style of printing text gets extremely tedious after a while.

2

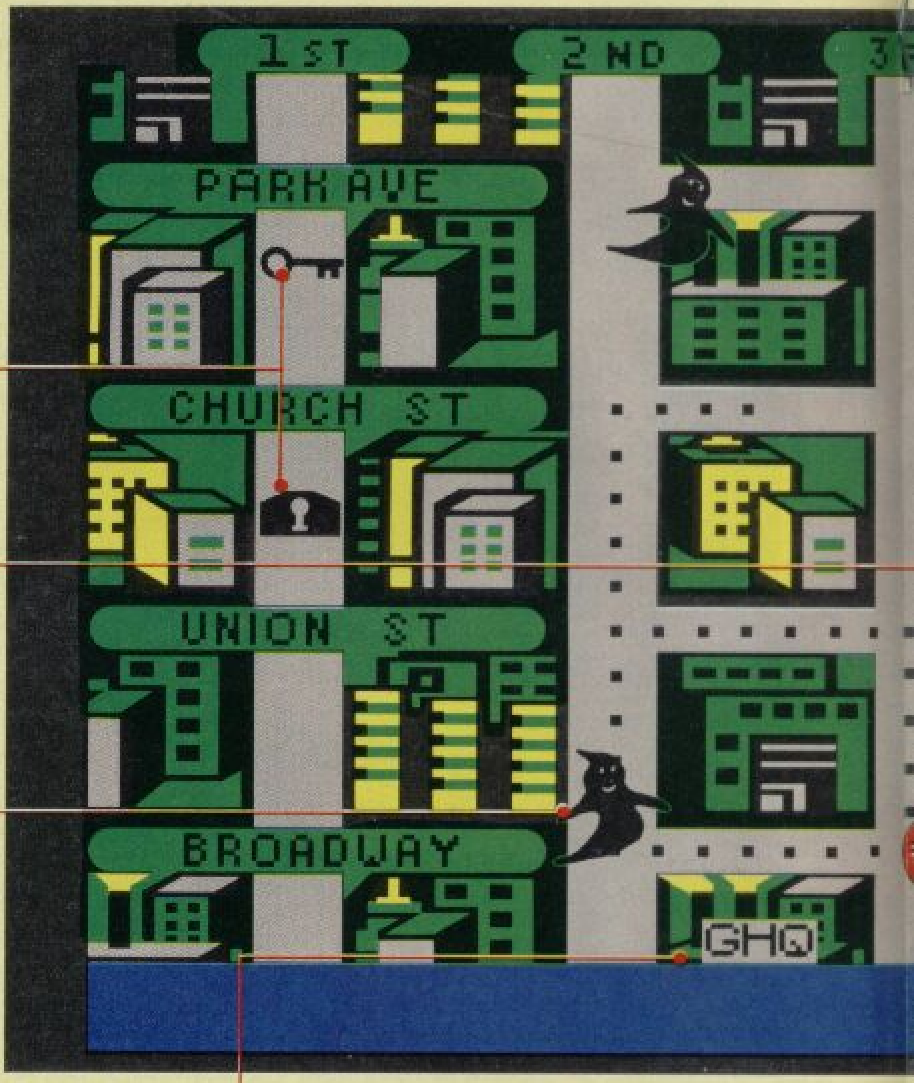


The VW Beetle
This vehicle's cheap, but it only carries five items and chugs along at a mere 75mph. It's not really that good a buy as it won't hold all the items you can afford to purchase and it's so slow that you'll be reaching for those abort keys quicker than you can say 'Gremlins'. Of all the monitoring equipment on offer, the Image Intensifier is the most useful, allowing you to keep a constant watch out for those Slimers.

3



The Hearse/Station Wagon
Both of these vehicles are good buys, but the extra speed offered by the station wagon could be considered by some to be worth the inflated price tag. The capture equipment on offer is all too important — be sure and purchase some Ghost Bait, and a Ghost Trap is pretty essential as well. The Ghost Vacuum will allow you to suck up the spooks when you're out roaming the streets.



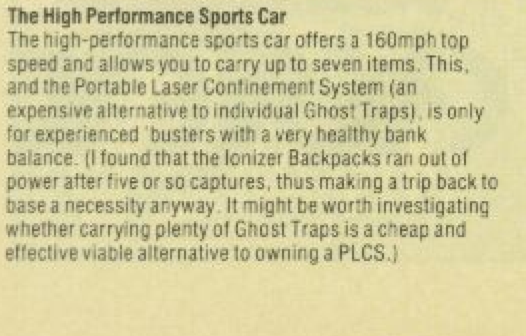
There's no way you can stop the Keymaster and Gatemaster on their relentless journey to Zuul — just make sure that your bank account is healthy to the tune of $10,000 when they meet. Otherwise, you lose!

All the floaters, as well as the Gatemaster and Keymaster, are heading towards the Temple of Zuul. It's also where you'll end up for the final confrontation.

The ghosts, or 'floaters', fly in from each corner of the map. Don't let their slowness fool you as they first enter the map — they speed up and, pretty soon, all hell's let loose!

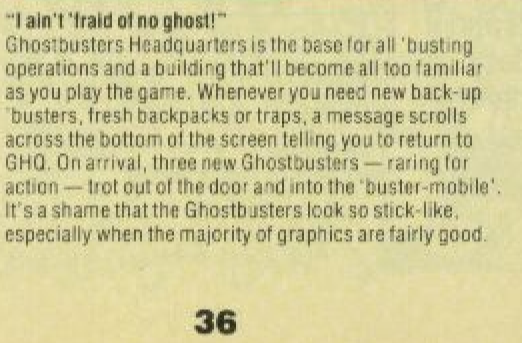
If you run out of traps, your 'busters have all been 'slimed' or your backpack's run out of energy, you'll need to head back to Ghostbusters Headquarters (GHQ).

4



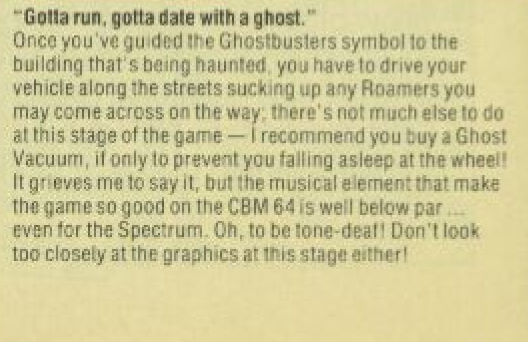
The High Performance Sports Car
The high-performance sports car offers a 160mph top speed and allows you to carry up to seven items. This, and the Portable Laser Confinement System (an expensive alternative to individual Ghost Traps), is only for experienced 'busters with a very healthy bank balance. (I found that the Ionizer Backpacks ran out of power after five or so captures, thus making a trip back to base a necessity anyway. It might be worth investigating whether carrying plenty of Ghost Traps is a cheap and effective viable alternative to owning a PLCS.)

5



"I ain't 'fraid of no ghost!"
Ghostbusters Headquarters is the base for all 'busting operations and a building that'll become all too familiar as you play the game. Whenever you need new back-up 'busters, fresh backpacks or traps, a message scrolls across the bottom of the screen telling you to return to GHQ. On arrival, three new Ghostbusters — raring for action — trot out of the door and into the 'buster-mobile'. It's a shame that the Ghostbusters look so stick-like, especially when the majority of graphics are fairly good.

6

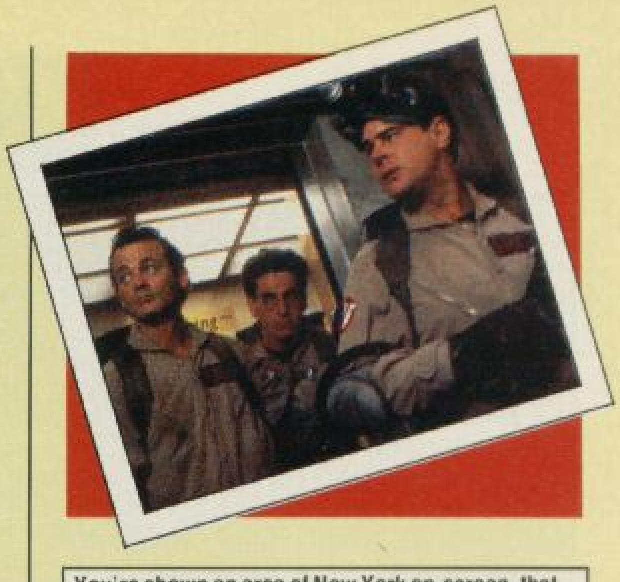


"Gotta run, gotta date with a ghost."
Once you've guided the Ghostbusters symbol to the building that's being haunted, you have to drive your vehicle along the streets sucking up any Roamers you may come across on the way; there's not much else to do at this stage of the game — I recommend you buy a Ghost Vacuum, if only to prevent you falling asleep at the wheel! It grieves me to say it, but the musical element that make the game so good on the CBM 64 is well below par ... even for the Spectrum. Oh, to be tone-deaf! Don't look too closely at the graphics at this stage either!

MARK WATKINSON

SEEN A GHOST?

...re package than to wait until the film, book and T-shirt have all ... own product while the market's still eager. When Ghostbusters ... this country, Activision launched a version of the eponymous ... Ghostbusting' thrill has died down a bit, the Spectrum version of ... and Dave Nicholls are unhappy to report, it just hasn't got the ... man and Nicholls draw their paranormal conclusions . . .





In the later stages of the game, you'll be wishing you'd bought a Marshmallow Detector to warn you that the Stay-Puft Marshamallow Man's in town! Once you've got him in your sights, you've got to lay a trap with Ghost Bait to catch this lovable fiend.

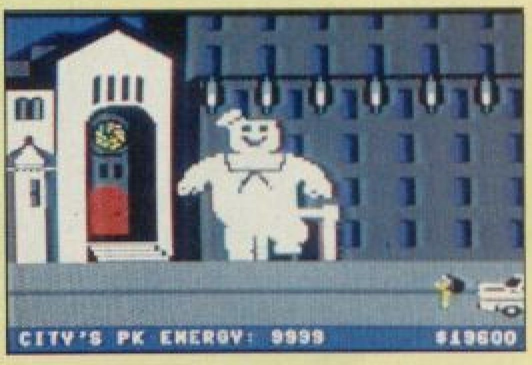
This is where you really get down to the Ghostbuster business. As soon as a building starts flashing red, you can be sure there's a Slimer causing some trouble . . .

As you pass by a building, it may begin to flash a lavender colour — which means that, although there might not be a ghost on the premises yet, you won't have long to wait!

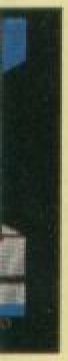
This familiar-looking symbol is you . . . the dots that follow it trace the path to your next location. Look out for floaters on your travels, as you'll score extra cash for hoovering them up in your Ghost Vacuum.

You're shown an area of New York on-screen, that seems to be positively teaming with ghosts ... and their fate's in your hands. Buildings on the map that flash red denote the presence of a Slimer; at this point, it's your task to steer the Ghostbuster's symbol to the scene of the psychic disturbance. The longer you take to reach your destination, the longer you spend driving the car in the next sequence of the game. If all goes quiet in the buildings, you can opt to do a bit of spring-cleaning and vacuum up a few of the ghosts floating around. However, you must stay alert for the 'Marshmallow Man' warning and quickly drop some Ghost Bait; if you manage to avert the danger, the Mayor will give you that $2,000 reward.

10

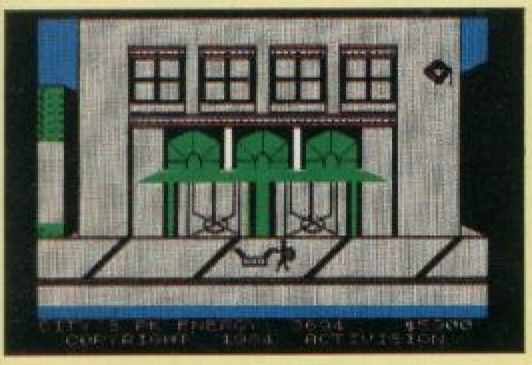


"Oh sh*t! It's the Stay-Puft Marshmallow Man."
Yes, guarding Zuul is the great Marshmallow Man himself, and obviously a very funny character if you live in America! However, in the game as in the film, this character's no joke ... he can stamp on you! The idea of this part of the game is to sneak two of your 'busters past his bouncing mass; if you mis-time things slightly, don't be surprised if they're squashed underfoot. But, if they make it, then it's congratulations all round and you're given a unique account number which you can use next time you want to play the game. For some reason, you never get to see the summit of Zuul — but maybe that's being saved for the sequel. As a game, *Ghostbusters* is about average, and I'm sure the film will generate a large market for it. I'd like to be able to say it's better than the CBM 64 version ... but it's not, and that's a great shame as it'll be a great disappointment to a lot of people.



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7



"Try to imagine all life as you know it stopping instantaneously and every molecule in your body exploding at the speed of light. Total protonic reversal."
That's what happens if your 'busting team manage to cross the ionizer streams while trying to trap a spook, so be careful! To avoid such accidents, remember to walk your 'busters right up to the building (or the streams won't reach very high up) and drop the trap in the middle of the screen. Now manoeuvre one of the team to the far right and one stage right, and face them both inwards — you're now in a position to bust a ghost!

8

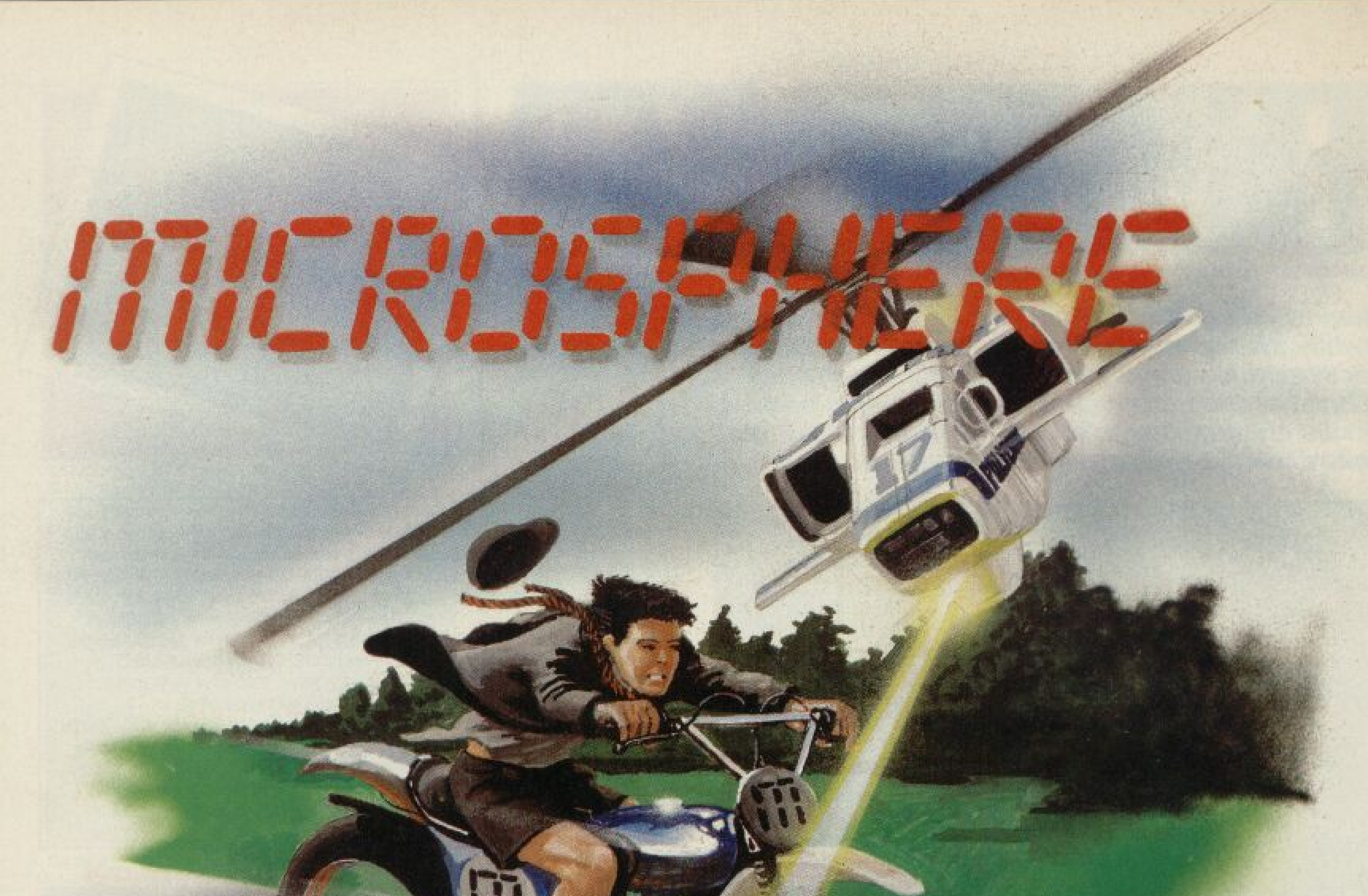


"He's an ugly little spud, isn't he."
And he's difficult to catch too! The Slimers flit about most unco-operatively and you often have to wait quite a while for the right moment to start blasting. Two techniques can be employed to trap the Slimers. First off, you can advance both 'busters and trap the foul Slimer under the canopy of the streams; watch out, though, that it doesn't escape between the streams. The second, and recommended, method is to wait for the Slimer to be just on the inner-side of one of the 'busters, then turn on the beam and advance towards the trap.

9



"We came, we saw, we kicked its a*s!"
If you spring the trap just as the Slimer moves over it then — Hey Presto! — one less 'Class 5, Full-Roaming Vapour', and up goes the cry (and it's bad enough to bring tears to the eyes) 'GHOSTBUSTERS!'. If, however, something didn't quite go as planned, then prepare to be 'slimed'. With a bit of practise, though, you'll soon manage to avoid this unpleasant experience and the cash will come rolling in. Then, if you've got more cash than you started with when the city's PK level reaches '9999', you'll have to start the final journey to Zuul.



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HEY, ANYONE SEEN A GHOST?

HACKER'S GUIDE

***Codebusting makes* Dave Nicholls *feel good . . . especially on Activision's* Ghostbusters.**

By and large, there are really only a couple of reasons why people become hackers, and they tend to divide the hacking community into two distinct groups. There are the practical hackers who go in search of infinitive lives POKEs and new programming techniques. And then there are the hard core lunatic hackers who do it for fun!

I have to admit that I fall into the latter of these two groups and I'm proud of it! For me, hacking's akin to an adventure game, in which I'm pitting my wits against the programmers. To this end, I usually work my way methodically through most of the game to find out what's going on — but I get the most of my kicks out of 'reading between the instructions' and trying to work out how the program was developed. And *Ghostbusters?* Well, let's just say I had a lot of fun with that one!



Luckily, the first thing I noticed was that *Ghostbusters* uses one of the Ultimate software protection techniques; by this I don't mean that it's the best, it's simply the same one that Ultimate used for *Underwurlde.* There could be several reasons for this — either Activision has 'borrowed' it from Ultimate (or *vice versa*), or a third party may be going round selling the same idea to everyone. And if someone is getting into the 'protection racket', then software houses had better realise that if they all use the same method — no matter how good it is — the result can be counter productive. To qualify this statement, let me say that when I first hacked into *Underwurlde,* the protection employed was new to me and it was a devil of a job to break into; *Ghostbusters'* protection, on the other hand, being so similar allowed me entry to the code within five minutes!

Once in, I did my usual run through the game and found that, although it's generally well-written, there are tell-tale signs that the package was thrown together in a hurry. Some of the routines are not in the most logical positions and there are some rather surprising 'garbage' bytes floating around; for example, up near the top of memory there's some assembler source code! Meticulous hackers may also notice a 340 byte routine that reads in blocks of bytes from the Interface 1 RS232 port that's been left lying around. Quite why these lumps of code were saved off on to the master tape is anybody's guess!

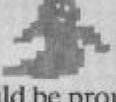
Most of the rest of the code is quite boring — except, of course, for those routines containing the speech; this is an example of the simple 'recording' technique where a program samples the earphone socket and creates a 'bit stream' which, when played back out again, recreates the original sound (with a few crackles thrown in for good measure). Although it's by far the simplest way of generating speech, there's rather a heavy toll on memory; it takes around 3.5K of memory to reproduce the three spoken phrases in *Ghostbusters!*

Another routine I particularly like isn't at all revolutionary, but it *does* use some old theories very effectively. The map of New York is stored as a series of two byte pairs, the first number of which is normally a count for the second byte.

For example, if the first byte is '10' and the second '32', then the next ten screen locations are loaded with '32'; if, however, the first byte is a zero then the next byte is a count of the number of times the next block is repeated (a block is delimited by two zero bytes at the end). It may sound complex, but Activision's managed to squish the whole screen with all of its attributes into just 1370 bytes — a compression ratio that even Level 9 would be proud of!



***It takes around 3.5K of memory to reproduce the three spoken phrases in* Ghostbusters!**



By the way, before we move on to the tricky bits, watch out for a bug when you go to catch a Slimer — if you drop the trap too low down on-screen, when you catch the ghost, your Ghostbusters won't be able to retrieve the trap; at this point, the game gets stuck until you relieve the boredom by returning to the main menu for a new game. I'm working on a fix at the moment which will hopefully appear in a future *Hacking Away* column.

And, here's your chance to play *YS Bingo!* Next time you're asked for your name, enter 'CODEBUSTERS' and use account number 00166605 — it's the easiest way I know of starting off with $1,000,000 (minus V.A.T., of course!).

To add POKEs to *Ghostbusters,* you have to create a new header to stop it from auto-RUNning. First of all, type in the fake header given, RUN it and save it on to a blank tape. Now, listen to the *Ghostbusters* master tape and stop it just after the initial header (the first screech you hear on the tape). Remove the master tape (without re-winding it!) and replace it with the cassette containing the false header. Type 'LOAD""' and, as soon as the header's loaded, swop the tapes around again and start the master up again. Then, when the 'OK' message appears, stop the tape (don't re-wind it) and type the following as a direct command:

POKE 24578,251: POKE 24579,207: RANDOMIZE USR 24527

Now press the Enter key, and ignoring the message on-screen, type:

CLEAR 40000: NEW

Enter the second program given and RUN it. Start up the master tape for the last time and, once loaded, you'll find that you never lose a 'buster once slimed, a single trap will be sufficient because it never fills up, and your backpacks will never discharge unless you cross the beams. Not bad, eh?

GETTIN' INTO GHOSTBUSTERS

```
100 CLEAR 32000
110 FOR x=35000 TO 35028
120 READ a: POKE x,a
130 NEXT x
140 PRINT "Start Tape and press any key"
145 STOP
150 IF INKEY$="" THEN  GO TO 150
160 RANDOMIZE USR 35000
170 DATA 221,33,196,136,17,17,0,175,205,194,4,20
1,0,66,85,83
180 DATA 84,72,69,65,68,69,82,66,3,0,128,4,3
```

This program will create the fake header required to get around the *Ghostbusters*/Ultimate-style loader.

```
100 FOR x=56490 TO 56510
110 READ a: POKE x,a
120 NEXT x
130 DATA 175,50,141,159,50,255,156,50,177,158,50
,189,164,62,167
140 DATA 50,0,157,195,0,131
150 RANDOMIZE USR 56444
```

Our second program gives you unlimited 'busters, bottomless Ghost Traps and backpacks that never discharge!

CLUES FROM THE CASTLE

Clive Gifford, *the Black Baron of Castle Rathbone, gets on-line with* Peter Marment, Gary Smart *and* Neil Mackintosh *to check out your adventure problems this month. Also enlisted are Hairy Hacker* Dave Nicholls *and Green Goblin* Peter Shaw.

Calls this month have seemed to centre around Domark's *Eureka!* For this reason, we've enlisted the aid of *Eureka!* wizard, Steve Dale . . . and you can write to him for hints and tips on this adventure c/o *Your Spectrum,* 14 Rathbone Place, London W1P 1DE (please enclose an SAE for Steve's reply). But don't ask him about other adventures — he's still busy trying to fathom out the final clue in *Eureka!*. All other queries should be directed to Peter Marment, Gary Smart and Neil Mackintosh as usual.

Valhalla is still proving popular with callers, though some purists may argue that it's more of an arcade game than adventure. A fair proportion of the questions asked about *Valhalla* refer to problems in finding Drapnir. No problem — Drapnir is located north of Despair. Something else that seems to be hampering apprentice adventurers is that, having come across a chest or cupboard containing a quest object, there's no way to get the blasted lock open. No offence, but you're just too puny to attempt such heavyweight tasks on your own — try enlisting the help of a friendly God, such as Bodir, to help you.

Moving on, the Green Goblin, Peter Shaw (still trapped in the bowels of Castle Rathbone, stapled to the YS Helpline) has some hints and tips for those still floundering around with Ram Jam's *Valkyrie 17.*

According to ol' Green Fingers, the woman in the bar of the hotel is not actually a woman at all, but a male agent in drag! This may suggest the idea of stealing his wig, etc, and making an escape from the hotel in disguise . . . but, unfortunately, this just won't work. What you have to do instead is collect the sheets from the laundry room on the first floor and move down to the window at the end of the corridor. Here, you have to open the window and climb out on to the ledge. Make a rope out of the sheets you have and move around the ledge until you can find something to tie the sheets on to. Then, you can climb down and wander around the town.

But what's the use of hitting the town without any money? Luckily, there's a safe in one of the rooms, which you'll need to prise open with the object inside the glass case in the infirmary. Of course, you'll have to break the case, but if you look around the room under construction you should find the odd piece of rubble. Need I say more!

YS ADVENTURE HELPLINE

England and Wales: Gary Smart (0264) 59489 and Peter Marment (0264) 66660.
Scotland: Neil Mackintosh 041-332 2216.

ROUTINE ADVENTURES

Starting this month, we're going to be presenting a number of routines that can be incoporated in your own programs. It may seem an arduous task to write a full-blown adventure, but you'll find that most of the individual routines are no bigger than the one given here. Perhaps the most difficult aspect of adventure programming is making sure that all the component parts of the program fit together in full working order. Of course, you'll need to get your imagination in gear — but that's up to you!

Moving on to specifics, your first task is to give the computer the ability to recognize commands entered by the players.

IN A COMMANDING ROLE ...

The routine given assumes that any command input will be stored in the string a$; the punctuation is then removed and the input is checked against the words held in the string c$. Type the routine in and RUN it; try replacing the words in quotes in the IF ... THEN statements in lines 1070-1080 to customise the routine for your own adventures.

When you input a word, it's stored in string c$ and that's then checked against the words stored in the IF ... THEN statements. Of course, there's more than one way of checking the words input - for example, for a one-word command like 'QUIT', you could include line:

```
IF c$="QUIT" THEN STOP
```

Of course, if you're offering the player the choice of a number of words, the program will have to be programmed to accept them. Try using a line like the following:

```
IF c$="KILL" OR c$="SLAY" THEN
GO SUB ...
```

Certain words, such as 'NORTH' will always be used in adventure programs — but it soon beomes tedious to have to

'VENTURING OUT...

GHOULIES
IMS Software/£7.50

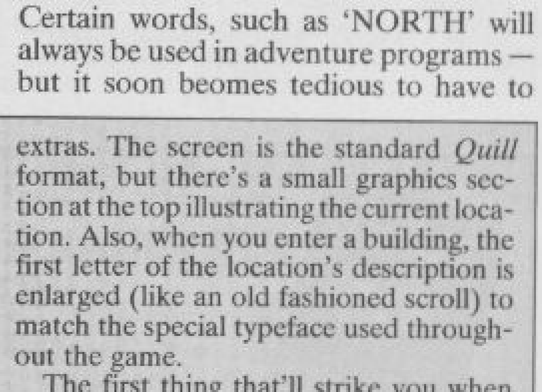
It's rather sad that certain adventure games on the market find it necessary to hide their origins. I refer, of course, to those written using Gilsoft's *Quill* utility. I assume the reasoning is that the buying public are prejudiced into thinking they're in some way inferior. True, there are some awful adventures, but most are quite good and often very competitively priced. Just because someone is the best machine-codist in the world doesn't mean they have the ability to write good adventures — *Quill* simply gave people with adventure ideas an easy way to try them out without the hassle of machine crashes; in fact, software houses have been using utilities like it for years! In *Ghoulies,* the code has been changed and graphics added, but the basic adventure was obviously written using *Quill.* Come on IMS Software, it's a good adventure, so why not show your appreciation by giving Gilsoft a mention!

Enough gripes about the software industry and back to Ghoulies. Your task is to find some magic treasure produced and hidden by an alchemist, Father Gilbert, before he died in the torture chamber of the Spanish Inquisition. It's now many years after his death and you've arrived on the ferry to start searching.

Ghoulies has all the features you'd expect from a *Quill*ed adventure — two word commands, instant responses, and save and load facilities — but there are extras. The screen is the standard *Quill* format, but there's a small graphics section at the top illustrating the current location. Also, when you enter a building, the first letter of the location's description is enlarged (like an old fashioned scroll) to match the special typeface used throughout the game.

The first thing that'll strike you when you begin playing *Ghoulies* is the way in which the graphics, typeface and descriptions together produce a superb Gothic atmosphere. Another surprise is that there's so much going on — fat men with cheeses wander about, and ghouls steal corpses from gibbets, to name but a few. *Ghoulies* has so much atmosphere, it's difficult to get around to solving any of the problems (that's my excuse anyway!)

It's a shame IMS Software haven't admitted using *Quill,* but, all in all, *Ghoulies* deserves 10 out of 10 — but don't play it in the dark!



Although it's a *Quill*-ed adventure (on the quiet!), *Ghoulies* still rivals most of its adventurous competitors.

DOOMDARK'S REVENGE
Beyond Software/£9.95

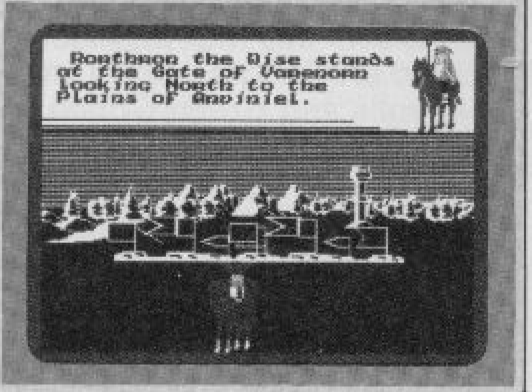
When *Lords of Midnight* appeared on the software scene, it immediately carved itself a place in adventuring history — nothing like it had been seen before and many adventurers turned into tacticians overnight in their attempts to defeat the Witchking. Now, with debates about the best way to succeed at *LOM* still raging, the sequel has arrived and Luxor the Moonprince's problems are far from over!

Doomdark's Revenge takes over where *Lords of Midnight* left off with the Ice Crown destroyed and the Witchking killed. Unfortunately, Doomdark's daughter, Shareth, Empress of the Icemark, swears revenge on Luxor and kidnaps Morkin, Luxor's son, and locks him away in her fortress. At the start of the game, Luxor, Rorthron the Wise and 1,000 Riders have just entered the Icemark to attempt to rescue him; as the player, you get to control all of these characters as well as Tarithel, daughter of the Lord of Dreams and Morkin's newfound love. As the game progresses, other characters may be recruited and controlled by the same 'SELECT' key mechanism used in *Lords of Midnight.*

Doomdark's Revenge comes in the same packaging as its predecessor but the keyboard overlay has been changed to accommodate the extra functions offered; these include four separate keys to perform the functions that the 'THINK' key did in *LOM* so that the progress of battles and states of health can be checked without reading through all the other information. Movement controls haven't changed with keys '1' to '8' heading you in a certain direction and the 'Q' key actually making the move. The playing area has been expanded and now offers some 48,000 different views to be examined. There are also underground tunnels crossing the land which you can enter via pits and gates.

The object of the game is twofold — firstly, Morkin must be rescued, and, secondly, Shareth must be destroyed. It's possible to gain a 'minor' victory by just rescuing Morkin but to find out the 'Watchwords of Midnight' and win the prize of a model of Icemark with figures of the major characters, both parts must be completed.

Doomdark's Revenge is a much more difficult and, in a lot of ways, more interesting than *Lords of Midnight* — save up those pennies and buy it!



The long awaited follow-up to *The Lords Of Midnight* has finally arrived . . . but is it different enough to be a hit?

type the word in each time. Thus, you should use:

IF LEN c$>0 AND LEN c$<=5 THEN IF c$="NORTH" (TO LEN c$) THEN GO SUB ...

The above sorts out how many characters you've input and then, using string slicing techniques, compares them to those already stored in c$. For example, if all you'd typed was 'N', the routine assumes you've entered the command 'NORTH'.

You'll probably find that you will need to have two routines like this in your adventure program — one to check the verb and one for the noun. Be here next month and we'll look at numeric arrays and their role in structuring an adventure game. YS

```
   1 POKE 23658,8
  10 INPUT A$
  20 GO SUB 1000
  30 GO TO 10
1000 REM Command recognition
1010 FOR a=1 TO LEN a$
1020 IF (a$(a)<"0" OR a$(a)>"9")
 AND (a$(a)<"A" OR a$(a)>"z") TH
EN  LET a$(a)=" "
1030 NEXT a
1040 FOR a=1 TO LEN a$
1050 IF a$(a)=" " THEN  LET c$=a
$( TO a-1): LET a$=a$(a+(1 AND (
a+1)<=LEN a$) TO ): GO TO 1070
1060 NEXT a: LET c$=a$
1070 IF c$="KILL" OR c$="SLAY" T
HEN  PRINT "NO VIOLENCE PLEASE,
THIS IS A   FAMILY DEMO."
1080 IF LEN c$>0 AND LEN c$<=5 T
HEN  IF c$="NORTH"( TO LEN c$) T
HEN  PRINT "TOUGH, NO EXIT NORTH
"
1090 IF c$="QUIT" THEN  STOP
1990 IF (LEN a$=LEN c$) AND a$=c
$ THEN  RETURN
2000 GO TO 1040
```

The 'command recognition' routine, that compares the input words in a$ to those stored already in c$.

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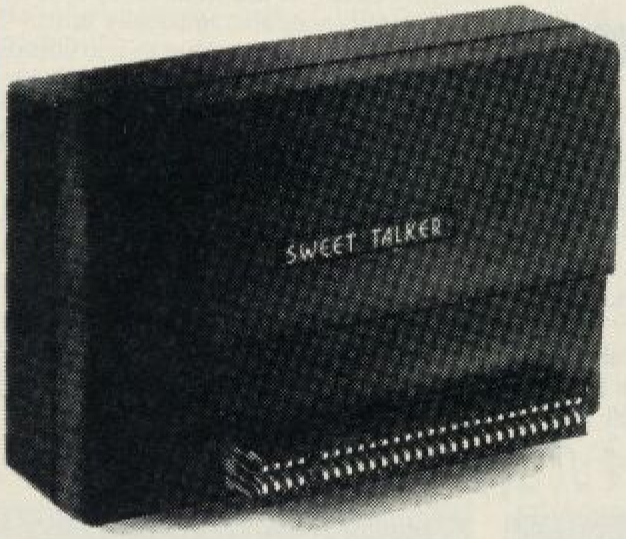


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INTO THE MUSIC

Over the past couple of years, apart from the odd snatch of a tune in games software, very little attention has been dedicated to the development of good music utilities. Composer and electronic designer Adrian Wagner checks out five of the latest packages available to see if the wait was worthwhile.

As I'm speaking among friends, we can all admit that, musically, the Spectrum's not up to much. But although its sound capabilities are certainly limited, they can prove to be very usable. Trouble is, the Spectrum itself doesn't come prepared, either from the hardware or software point of view, to make beautiful music. But, of course, there's a way around this problem ... and the answer's in the software. First, though, let's review the present situation.

ON BOARD OPTIONS

You've got three basic parameters to play with in order to make music, and they can all be found in chaper 19 of the Spectrum manual; they are, of course: BEEP — the frequency or pitch of the note; PAUSE — the time before the next

MUSIC MAKER

Price: £1.99
Supplier: Malan Associates, PO Box 390, Purleigh, Essex CM3 6QQ.

This package offers little instruction on its use other than the blurb on the badly printed paper index card. This is a shame, because I found it quite easy to use — the only exception being that R Green (the programmer) decided to use a 10-line stave instead of the five line standard. As much as we need innovation in the world of music, I'm afraid this only adds to the confusion.

The screen information was enough to help me to store notes with ease but, unfortunately there's no facility to introduce sharps and flats! This, of course, makes the program musically unusable. But even worse, on playback it turns out that the notes are not what they say they are; for instance, a scale of C turns out to be a row of semitones starting from C and ending with G!

I think R Green would be well advised to take some music instruction before attempting any more music programs!

PLAY, TYPE AND TRANSPOSE

Price: £4.95
Supplier: Hilton Computer Services, 14 Avalon Road, Orpington, Kent BR6 9AX.

This software package comes complete with a seven-page manual, which tells you that the *Play* program plays tunes entered as a series of BEEP and PAUSE Basic statements. The question is, why was the program written at all?

Having loaded the cassette, you're asked how many sharps and flats are required; the problem here is that your key signature will contain *either* sharps or flats, but not both! After you've waded through a couple of screens giving you information on the pitch card and how to cope with metronome markings, you're in for a real thrill. The program breaks out and asks you to type your tune in Basic. What all this means is that after you've shelled out your hard-earned money for this package, you're told to type in the equivalent of what appears in chapter 19 of your Spectrum manual. Out of interest, I tried writing a tune and altering the musical parameters, but it made not the slightest difference.

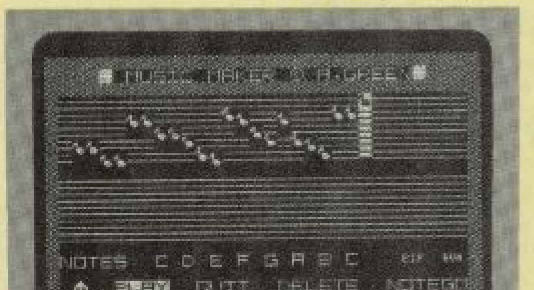
The other program in this package is *Music Typing and Transposing* which is much the same as *Play* — tedious and boring.

MUSIC TYPEWRITER

Price: £9.95
Supplier: Romantic Robot, 113 Melrose Avenue, London NW2.

This package contains a very fast and easy-to-use non-real time sequencer that can process up to 16 tunes in memory. The writing and editing facilities are slightly easier to use than on *Spectune*, but then they're also musically more precise. You're even able to use complex timings like triplets and staccato notes with this package.

But the exceptional part has got to be the notation — it has to be seen to be believed! The way *Music Typewriter* prints up musical notation on-screen puts many expensive professional computer music systems to shame. The notes are tied together when necessary and, when in play mode, the music's printed out as the piece is played. The accuracy, even at fast speeds, is



Music Maker: Not one of the most brilliant pieces of coding I've come across, but then it's one of Malan's budget range for just under two quid! Bad graphics and poor use of colour are the first things you'll notice — but this is nothing to the lack of musical awareness shown by the program's designer; for instance, how many sheets of music manuscript have you seen with ten ledger lines? Altogether, a very confusing program and not really worthwhile if you have musical aspirations. 1/5 **Peter Shaw**



Music Typewriter: This is certainly one of the most professional music editors I've seen! Out of the five packages here, Music Typewriter sports the best musical notation (the graphics are excellent!) and speed, plus a very easy-to-use editor that incorporates a full error-check of the length of each bar. It also comes with a keyboard overlay — which isn't much use if you've got a replacement keyboard or a Speccy+, but it's a nice thought. 4/5 **Peter Shaw**



Reviewing our musical software is modern composer and electronic designer, Adrian Wagner. Adrian can claim four LPs to his name — *Distances Between Us, Instincts, Inca Gold* and *Disco Dream of the Androids* — all featuring his own compositions on the synthesiser.

But, unlike his great-grandfather Richard Wagner, Adrian's not just concerned with writing music, he's also heavily involved with the production of synthesisers. Adrian was instrumental in the invention of the Wasp and Gnat synthesisers and, at present, he's working with Francis Monkman (ex-*Sky* and *Curved Air*) on a long-term project that they hope will revolutionise the synthesiser as we know it today.

note; and duration — the 'on-time' of the note. Circumventing the need to get too musical, the Spectrum allows the pitch to be expressed in numerical terms, with middle C at '0', concert A at '9' and the C below middle C at '-12'. Duration of the note and pauses are expressed as '1' for a one second burst, '.5' for a half a second, and so on. By using a look-up table, it's quite simple to create a program that's an easy-to-use musical sequencer (*See* Tuning Up *this issue. Ed.*).

There are a number of musical utilities on the market and I've chosen five which purport to extend the musical capabilities of the Spectrum. It's best to have a good idea of what you're looking for in a music package — do you want to learn how to write music, play pretty tunes, or both? As you'll see from the five packages I've looked at here, they do vary quite dramatically in their musical awareness, and if you imagine that they've had the same programming dedication lavished on them as on much of today's games software, you're in for a shock!

Please be extremely careful when choosing the right program to buy — some can be *really* disappointing. YS

astonishingly good.

The program contains three pages of menu: Page 0 provides facilities to play, repeat, write, edit, and print; Page 1 changes key signatures, time signatures and tempo; and Page 2 catalogues the tunes with their respective titles and length.

The supplied manual comes complete with a keyboard overlay — which does help when you're playing the Spectrum as a musical keyboard. It would have been nice to see a demonstration program (like the one in *Spectune*), but you pays your money and you takes your choice. For me, though, the advanced musical notation definitely gives this one the edge.

MUSIC MAKER

Price: £5.75
Supplier: Bellflower Software, 6 Rosewood Avenue, Greenford, Middlesex.

This program comes neatly packaged with a helpful index card; the instructions have been well-written and are very easy to follow. Unlike some of the other packages in this review, the programmer obviously has some knowledge of music — which I do feel is important!

The screen has been quite well laid out; the only problem here being that it displays only one bar at a time while you're inputting notes. Staying with the process of writing your tune on-screen, the program won't allow you to delete more than one note back — and even then, it has to be in the same bar. This means that if you do make an error, you've got no choice but to start all over again. On playback, it first *prints* the notes on the screen in non-real time and then *plays* them back in real time.

Music Maker allows you to add to the existing melody and store it on to cassette for later use; if you possess a printer, you can also obtain a hard copy and alter the speed of the playback.

Overall, this program's pretty good — but it should have included a suitable editing facility.

SPECTUNE

Supplier: XORsoft

Spectune converts the Spectrum keyboard into a two and a half octave musical keyboard that can be made to record, recall, edit, save, merge and print. The instructions explain concisely how to change the length of each note, the tuning mode (which re-tunes any note for interesting scales), selecting key signatures, time signatures, writing and editing, and so on.

Diving straight into the teaching part of the software, a user starting from scratch can learn the basic techniques of playing and writing music in very simple terms. Using an on-screen keyboard, the relevant keys blink in red and an explanation of how music is printed follows. When you've had enough of the demonstration program, you're then ready to load in the main operating program.

You're offered three options from the on-screen menu, the first of which is a learning game to help you sort out exactly where you are on the keyboard. A note's printed up on-screen and you've got to find it on the keyboard within three lives. It's fun and a useful learning aid — something other programmers should take note of. Returning to the main menu, the second option — edit/write mode — is very easy to use. Having selected a note and specified its length, it's entered into the sequencer. If you change your mind, you can go straight into the editing mode and change any notes by scrolling to the left or right to insert, delete or alter any part of the composition.

The last option on the menu is the play mode. You're now programming music in real time and the sequencer's recording *exactly* what's played, including your mistakes! But, even if you have entered your tune in real time, the editor *still* allows you to remove or change any unwanted notes.

Spectune allows up to 26 different tunes in memory at any one time; these can be merged together in any sequence in the final composition. You can also make a hard copy of your tunes on a printer.

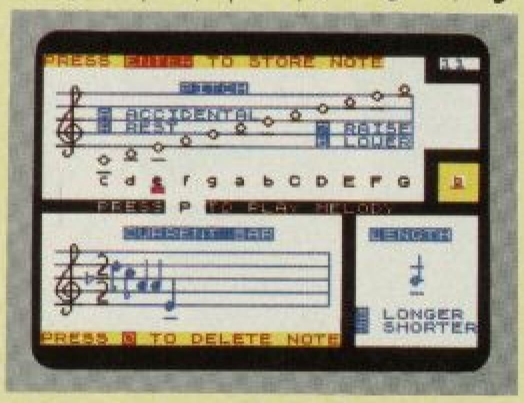
Overall, *Spectune* is a very well-written program, and one that I can recommend. It's a useful educational tool that's fun to use.

OUT OF TUNE?

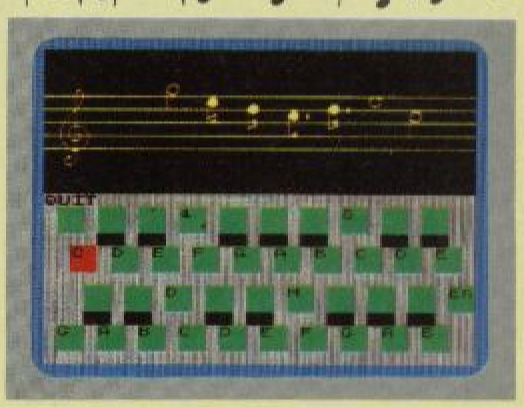
Here at *YS*, we have piles of software flung our way by various suppliers — some good, some bad, but all worthy of mention. Trouble is, once the review copy came back from Adrian, we realised that no-one had the slightest idea where XORsoft is based and how much its package, *Spectune*, retails at. Standing up to its first test, the *YS* filing system broke down completely — so now it's up to you! If you've heard of XORsoft and can tell us where the company's based, give Trouble-shootin' Pete a ring on 01-636 2416. It's a pretty good package, and deserves a little more than anonymity.



Play, Type and Transpose: Either I've missed something crucial, or there isn't anything in this program that couldn't be explained better on paper. After the program's loaded, you're asked to type in the key you want to play in and the speed you want to play it at. Then, instead of diving into some all-signing, all-dancing music editor, the program stops and asks you to type in the relevant BEEP statements for yourself, providing a 'pitch card' on-screen for reference purposes. Try reading the Spectrum manual and save yourself some cash! 1/5 **Peter Shaw**



Music Maker: This is a good program, although slightly overshadowed by the standards of Music Typewriter and Spectune. The graphics have been quite well designed and the package is very easy to understand — but if you want to type in tunes of any length, then tedium soon sets in. Although the screens seem very 'busy' to begin with, the control keys are kept to a minimum to stop things getting too confusing. This program would be of most use to the musical novice (unfamiliar with the piano keyboard) who's keen to type sheet music into the Speccy. 3/5 **Peter Shaw**



Spectune: OK, so I'd never heard of XORsoft (Who has? Ed.) but that didn't stop this from being my favourite package of the five I play-tested. It was the only one of the programs to let me use the Spectrum's keyboard like a true piano synth (playing each note for as long as you hold the key, and then playing it back in real-time). The program was a little let down by the clumsy use of graphics and the confusing layout of the control keys. 4/5 **Peter Shaw**



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MULTISEARCH

After a brief sojourn writing commercial software, we welcome programming guru Simon Goodwin back to the pages of YS with his first major utility since ZIP! Multisearch might be somewhat smaller than its predecessor but, as a fully relocatable 'search and replace' utility in just 255 bytes, it too is dedicated to the art of speeding up your Basic programs. Don't limit yourself to any other utility — make more of Multisearch!

How many times have you laboriously gone through a ZX Basic program, replacing one item with another? Well, despair no more, *Multisearch* will quickly and automatically find and replace almost any selected item. This routine is easy to use and is only 225 bytes long. It'll run anywhere in memory (so it doesn't interfere with other utilities) and, what's more, turns out to have lots of useful and unexpected applications.

POWERFUL POSSIBILITIES

The possibilities of *Multisearch* aren't limited to changing one message for another. You can use it to edit long program lines, to replace keywords or to document programs (replacing line-number references with names). *Multisearch* will also work the other way, replacing names with numbers — which is very useful if you intend to compile a Basic program into machine code.

Most interesting of all is the possibility of writing programs which edit themselves; *Multisearch* can easily be called while a program runs. In this article we will investigate the internal format of ZX Basic and show how you can use *Multisearch* to make programs faster, more concise, or to protect them against people who want to fiddle with them (Troubleshootin' Pete, please note).

INSPIRATION

The idea of *Multisearch* came when *YS* reviewed a job lot of 'programmers' toolkits' a number of months ago. These are designed to make life easier for Basic programmers, but they all turn out to have a common flaw — they won't let you replace numbers in a program automatically.

Some of the toolkits had a 'search and replace' facility, but they all had annoying limitations — for example, *Super Toolkit* would only replace single keywords. The suggested use was to change LPRINT into PRINT or *vice versa*, but in fact that's pretty pointless because you can get the same effect on *any* Spectrum with a standard (but undocumented) command:

OPEN #2, "p"

This sends the output of PRINT statements to the printer until you cancel it with:

OPEN #2, "s"

If you want to work the other way, you can use:

OPEN #3, "s"

to send the results of every LPRINT statement to the screen. When you want to use the printer again, the command:

OPEN #3, "p"

will set things back to normal.

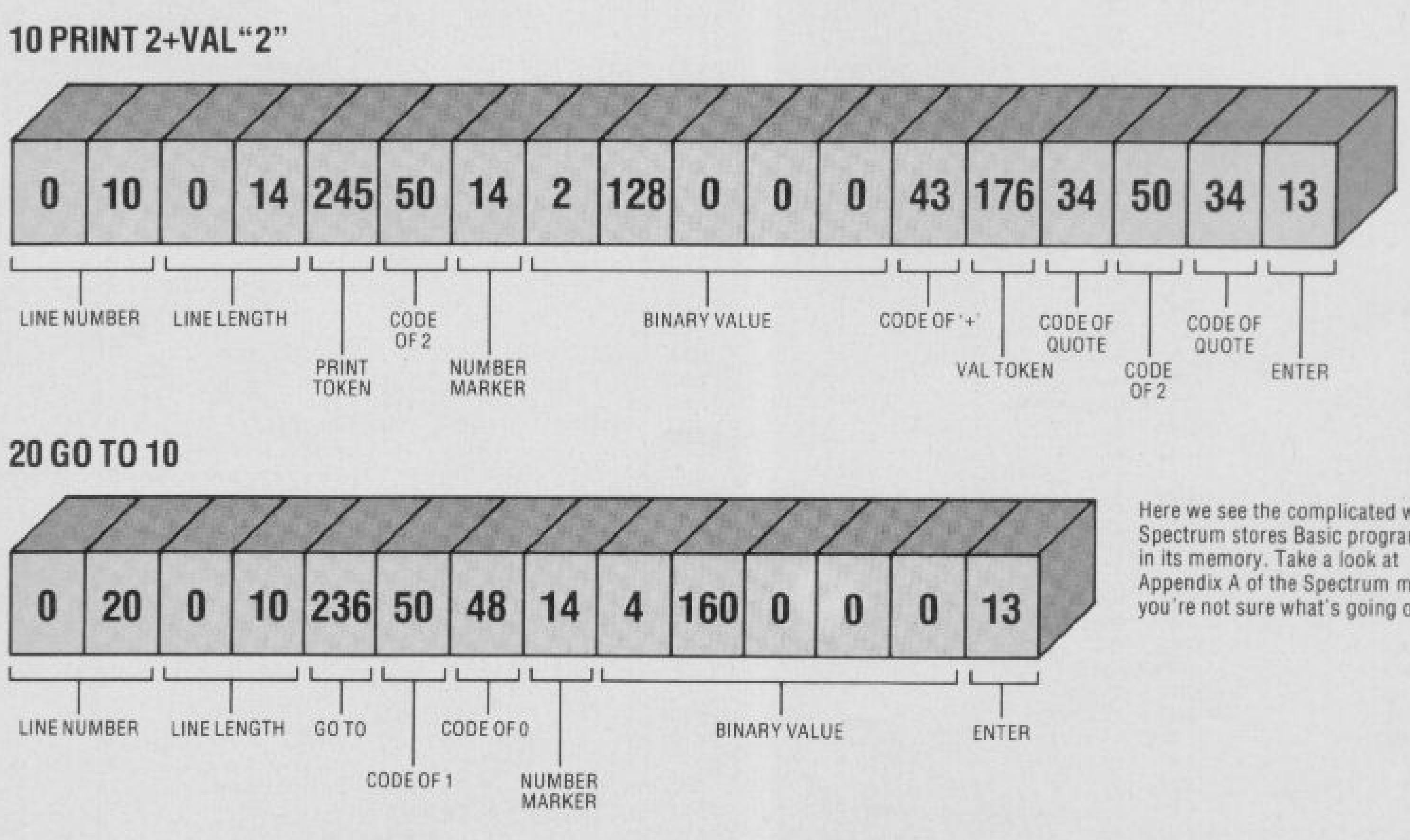
It's a bit more useful to be able to replace text in a program — perhaps you might want to Americanise the word 'colour' by replacing it with 'color', or enforce some similar indignity. But by far the most useful application baffles every single toolkit — the problem of changing numeric values within a program.

INSIDE BASIC

The accompanying figure shows the rather complicated way the Spectrum stores a simple Basic program:

10 PRINT 2+VAL "2"
20 GO TO 10

WHAT'S MY LINE?



Here we see the complicated way the Spectrum stores Basic program lines in its memory. Take a look at Appendix A of the Spectrum manual if you're not sure what's going on.

JANET BARRANCE

MULTISEARCH

Most of the data is ASCII code — for instance, 34 is the code of inverted commas and 236 is the code of the keyword GO TO. A full list of the keyword values is in Appendix A of the Spectrum manual — take a look at the strange way the Spectrum stores numbers.

Most numbers in a program are also stored in a hidden 'binary form' which takes up six extra bytes. This is meant to make programs run more quickly, by removing the need for the computer to convert numbers from text to binary whenever they are found. In practice, VAL "2323" can be handled almost as fast as the number 2323, and the first version uses three less bytes, because the string value doesn't have a hidden 'binary form'.

In the figure, you can see that VAL "2" needs three less bytes that '2' on its own. The number '2' is followed by a 'marker' byte (code 14) which tells the LIST routine to skip the next five bytes — the binary form of the number. When the program RUNs, the text is ignored and the binary form is used.

The binary is in a rather odd format — one which is explained in Dr Ian Logan's excellent book, *Understanding Your Spectrum* (published by Melbourne House). Luckily, with the aid of *Multisearch*, you don't need to understand the format to manipulate it.

The upshot is that numbers in ZX Basic programs need careful treatment, as they can gobble up memory at an alarming rate. Some expressions for numbers are even more concise than the 'VAL' version, because they use the keyword PI instead of a number. PI only occupies one byte in a program. The accompanying table lists a few common values and the expressions to replace them, along with the number of bytes saved ('n' represents any number).

You could use variables with preset values instead of numbers to get a similar saving in space, but beware — ZX Basic is rather slow at finding the value of variables; expressions like SGN PI may be worked out more quickly, especially if your code uses lots of variables anyway.

Interestingly, values expressed using the BIN function are also stored in two forms, so that BIN 1 soaks up eight bytes — one for the keyword, one for the digit, and an extra six for the genuine binary form.

The line numbers at the start of each line are stored in a more sensible 'packed' format — each number occupying just two bytes. They are converted into decimal by the LIST routine in the ROM. The two bytes after each line number hold the length of the line, so that Basic can skip quickly from one line to the next. An 'ENTER' character is at the end of every line. This format is briefly explained in the Spectrum manual, on page 166.

Value	Abbreviation	Saving (bytes)
-3	-INT PI	5
-1	-SGN PI	5
0	PI-PI	4
1	SGN PI	5
3	INT PI	5
n	VAL "n"	3

The table above shows you just how many bytes you can save if you start using constant expressions.

The first program given is a simple loader which will store the machine code for *Multisearch* at address 30000. To use it, simply RUN the program and if you've made no typing mistakes, the correct code will be stored. If there's a mistake in the data, an appropriate message should appear. It's wise to SAVE the program as soon as it has apparently run correctly, just in case an error has slipped through. If you save the code you can then load it again — without the Basic — at any address.

MULTISEARCH ON THE RUN

The routine is very easy to use, and all you need to do is load the code into any

The assembler listing for *Multisearch*. Grab an assembler (or a Hex loader if you're going to enter the Hex code on the left of each column) and get typing!

```
                ;           "Find Search string S$"
7530 2A4B5C     FINDS LD    HL,(VARS)
7533 7E         NEXT1 LD    A,(HL)
7534 FE53             CP    "S"
7536 280E             JR    Z,GOT_S
7538 FEB0             CP    T_END
753A 2806             JR    Z,ERROR
753C CDB819           CALL  F_VAR
753F EB               EX    DE,HL
7540 18F1             JR    NEXT1
                ;
                ;           "Variable not found!"
7542 CF         ERROR RST   8
7543 01               DEFB  1
                ;           "Parameter error!"
                ;           "(Wrong string length)"
7544 CF         L_ERR RST   8
7545 19               DEFB  25
                ;
                ;           "HL points at name S$"
7546 23         GOT_S INC   HL
                ;           "Check length is >0"
7547 7E               LD    A,(HL)
7548 B7               OR    A
7549 28F9             JR    Z,L_ERR
754B 23               INC   HL
                ;           "Check length is <256"
754C 7E               LD    A,(HL)
754D B7               OR    A
754E 20F4             JR    NZ,L_ERR
7550 23               INC   HL
7551 E5               PUSH  HL
                ;           "IX points at S$ text"
7552 DDE1             POP   IX
                ;
                ;           "Find replacement, R$"
                ;
7554 2A4B5C           LD    HL,(VARS)
7557 7E         NEXT2 LD    A,(HL)
7558 FE52             CP    "R"
755A 280A             JR    Z,GOT_R
755C FEB0             CP    T_END
755E 28E2             JR    Z,ERROR
7560 CDB819           CALL  F_VAR
7563 EB               EX    DE,HL
7564 18F1             JR    NEXT2
                ;           "HL points at name R$"
7566 23         GOT_R INC   HL
                ;           "R_LEN points at R$"
7567 22AE5C           LD    (R_LEN),HL
                ;           "Check length is <256"
756A 23               INC   HL
756B 7E               LD    A,(HL)
756C B7               OR    A
756D 20D5             JR    NZ,L_ERR
756F ED5B535C         LD    DE,(PROG)
7573 1B               DEC   DE
                ;
                ;           "**** MAIN SEARCH LOOP"
                ;
                ;           "Find length of line"
7574 13         LINE  INC   DE
7575 13               INC   DE
7576 13               INC   DE
7577 ED53AC5C         LD    (L_LEN),DE
757B 13               INC   DE
757C 13               INC   DE
757D D5         FIND  PUSH  DE
                ;           "Get old data length &"
                ;           "point HL at old data"
757E DD46FE           LD    B,(IX-2)
7581 DDE5             PUSH  IX
7583 E1               POP   HL
                ;           "Match B characters"
7584 1A         MATCH LD    A,(DE)
7585 BE               CP    (HL)
7586 2067             JR    NZ,GO_ON
7588 23               INC   HL
7589 13               INC   DE
758A 10F8             DJNZ  MATCH
                ;           "Match found, work out"
                ;           "difference of lengths"
758C 2AAE5C           LD    HL,(R_LEN)
758F 7E               LD    A,(HL)
7590 DD96FE           SUB   (IX-2)
                ;           "A = extra bytes needed"
7593 2849             JR    Z,NO_OK
7595 302C             JR    NC,ADD_A
                ;
                ;           "Discard 256-A bytes"
                ;
7597 ED44             NEG
7599 4F               LD    C,A
                ;           "Line length=length-BC"
759A 2AAC5C           LD    HL,(L_LEN)
759D 5E               LD    E,(HL)
759E 23               INC   HL
759F 56               LD    D,(HL)
```

free area of memory. It's 225 bytes long, so if you've already got another machine code routine from address 53246 onwards, you might CLEAR 53020 and load the code at 53021. *Multisearch* will work happily on a 16K computer. If you're really pushed for space you could load it into the printer buffer at 23296, so long as you don't use the printer until you've finished with *Multisearch*.

Wherever it ends up, you call the routine by jumping to its start — with RANDOMIZE USR 53021, for example. But before you do this you must tell *Multisearch* the text you want to alter. You do this by setting the Basic variables S$ and R$.

Logically enough, S$ should contain the text you want to search for, and R$ should contain the replacement. This is the essence of the power of *Multisearch* — the text can be program-generated, so you're not just limited to what you can type in. You can enter keywords in strings by typing THEN (Symbol Shift 'G'), followed by the keyword, and then stepping back to scrub out the THEN before you press Enter.

If you load *Multisearch* into the printer buffer you could try it out with this simple program:

```
10 LET S$="OLD TEXT"
20 LET R$="NEW TEXT"
30 RANDOMIZE USR 23296
```

When you RUN the code and LIST it you'll find that S$ and R$ now refer to the same text. Of course, S$ and R$ don't have to be the same length. The only restrictions are that both strings must be less than 256 characters long, and S$ mustn't be empty (!). In either case, *Multisearch* detects the problem before it tries to alter anything, and reports a 'Parameter error'. If S$ or R$ are not set, you'll receive a 'Variable not found' message and the program will be unchanged.

Multisearch is very fast, but it can take a few seconds to make major changes to a long program. You can break into it while it's working by pressing the Space key. The routine stops once it's made the current change and spits out a 'Break into program' message. If the routine runs out of room to make changes it'll do as much as it can and then report 'Out of memory'.

LABEL	VALUE	COMMENT
PROG	23635	Pointer to program
VARS	23627	Pointer to variables
R_LEN	23726	Pointer to replacement
L_LEN	23724	Pointer to line length
SHRNK	19E8H	Basic delete routine
XPAND	1655H	Basic insert routine
F_VAR	19B8H	Find next entry (ROM)
NUMBR	14	Hidden number marker
ENTER	13	Line end marker
T_END	128	Table end marker

You'll find these labels in the assembler listing; we've separated them for those of you having problems converting the assembly code for your particular assembler.

It's important to realise that *Multisearch* doesn't check the syntax of lines as it alters them — this would make it slow and much less versatile. However it means that you can thoroughly mess up a program by, say, changing all the LET keywords into POKEs.

If you corrupt a program in this way you'll get a 'Nonsense in Basic' error when you try to RUN it. Be careful if you change the keywords back automatically — you could end up changing genuine POKEs into 'nonsense' LETs. The moral of the story is to be careful before you use *Multisearch* . . . if in doubt, SAVE your Basic before you mangle it.

TRICKY DIGITS

This business of using strings is all very well, but it doesn't help us replace num-

```
75A0 EB                EX   DE,HL
75A1 B7                OR   A
75A2 ED42              SBC  HL,BC
75A4 EB                EX   DE,HL
75A5 72                LD   (HL),D
75A6 2B                DEC  HL
75A7 73                LD   (HL),E
              ;             "Adjust R$, S$ pointers"
75A8 DDE5              PUSH IX
75AA E1                POP  HL
75AB ED42              SBC  HL,BC
75AD E5                PUSH HL
75AE DDE1              POP  IX
75B0 2AAE5C            LD   HL,(R_LEN)
75B3 ED42              SBC  HL,BC
75B5 22AE5C            LD   (R_LEN),HL
75B8 E1                POP  HL
              ;             "Shrink from start"
75B9 E5                PUSH HL
75BA CDE819            CALL SHRNK
75BD 181F              JR   NO_OK
              ;
              ;             "Extended jumps"
              ;
75BF 18BC     FINDX JR      FIND
75C1 18B1     LINEX JR      LINE
              ;
              ;             "Add A bytes"
              ;
75C3 4F       ADD_A LD      C,A
              ;             "Add BC to line length"
75C4 D5                PUSH DE
75C5 2AAC5C            LD   HL,(L_LEN)
75C8 5E                LD   E,(HL)
75C9 23                INC  HL
75CA 56                LD   D,(HL)
75CB EB                EX   DE,HL
75CC 09                ADD  HL,BC
75CD EB                EX   DE,HL
75CE 72                LD   (HL),D
75CF 2B                DEC  HL
75D0 73                LD   (HL),E
              ;             "Update S$, R$ pointers"
75D1 DD09              ADD  IX,BC
75D3 2AAE5C            LD   HL,(R_LEN)
75D6 09                ADD  HL,BC
75D7 22AE5C            LD   (R_LEN),HL
75DA E1                POP  HL
75DB CD5516            CALL XPAND
```

```
              ;
              ;             "Copy new data to prog"
              ;
75DE D1       NO_OK POP     DE
75DF 2AAE5C            LD   HL,(R_LEN)
75E2 0600              LD   B,0
75E4 4E                LD   C,(HL)
              ;             "Check R$ isn't empty"
75E5 79                LD   A,C
75E6 B7                OR   A
75E7 2808              JR   Z,NEXT
              ;             "Bounce HL past length"
75E9 23                INC  HL
75EA 23                INC  HL
75EB EDB0              LDIR
              ;             "Search on from (DE)"
75ED 1802              JR   NEXT
              ;
              ;             "Try the next position"
              ;
75EF D1       GO_ON POP     DE
75F0 13                INC  DE
              ;             "Check user isn't bored"
75F1 3E7F     NEXT  LD      A,127
75F3 DBFE              IN   A,(254)
75F5 1F                RRA
75F6 3802              JR   C,CONT
              ;             "Generate BREAK error!"
75F8 CF                RST  8
75F9 14                DEFB 20
              ;             "Locate end of program"
75FA 2A4B5C   CONT  LD      HL,(VARS)
75FD B7                OR   A
75FE ED52              SBC  HL,DE
              ;             "Return at end of prog"
7600 D8                RET  C
              ;             "Check for new line no."
7601 1A                LD   A,(DE)
7602 FE0D              CP   ENTER
7604 28BB              JR   Z,LINEX
              ;             "Don't scan hidden nums"
7606 FE0E              CP   NUMBR
7608 20B5              JR   NZ,FINDX
              ;             "Skip over the number"
760A 210600            LD   HL,6
760D 19                ADD  HL,DE
760E EB                EX   DE,HL
760F 18E9              JR   CONT
                       END
```

MULTISEARCH

bers in program lines. We can't store a number in a string without putting it in quotes (or using STR$). LET A$="1" is OK, but LET A$=1 gives an error, and we've already discovered that numbers outside quotes have a special format. To illustrate this, try out the following program:

```
10 LET S$="40"
20 LET R$="60"
30 RANDOMIZE USR 23296
40 PRINT "Hello ";
50 GO TO 40
60 STOP
```

When you RUN this program it'll replace the text '40' in line 50 with the text '60'. However, it *won't* replace the hidden binary form; the program still prints out 'Hello' over and over again, because ZX Basic uses the binary form of the line number (still 40), and ignores the text completely. You end up with a line that reads GO TO 60 and performs a GO TO 40!

This is a very useful trick to discourage people from editing your programs — you can jumble up the text of the line numbers but the program will still work correctly because the binary forms are unchanged. The hidden binary is removed when a line is edited (to stop it getting in the way as you move along the line) and the binary is re-calculated from the text when you press Enter. This means that the jumbled values *are* taken literally after a line is edited, changing the way the program works and hence discouraging fiddlers.

You can save a little memory by replacing the text of each number by a single digit. However you can't dispense with the text altogether — there must be *some* numeric text between the GO TO and the CHR$ 14, or Basic will spot the subterfuge and give the game away with a 'Nonsense in Basic' error.

BINARY CHOICE

We still can't alter numbers properly. The routine so far will only change text within a program . . . it can't replace the binary form of numbers. The solution is to distinguish between numbers and strings, and use a small Basic program to work out the binary form of a number. An appropriate routine is given, which should be MERGEd with your Basic program once the *Multisearch* code is loaded.

Rather than use a complicated routine to generate binary forms, this program 'cheats' by storing the required number in a variable and then PEEKing the contents of the variable area (which always contains binary values in the same form as that used within programs).

To use the program type GO TO 9990 and press 'T' or 'N' to indicate whether you want to search for text or a number. Then type the data required, exactly as it appears in the program. If you select 'N', the program adds the numeric form to S$. Next you specify the replacement, which may (once again) be text or a number. The program STOPs once the requested changes have been made.

This technique is not ideal, but it does allow numbers to be changed properly without denying you the ability to alter numeric text and leave binary forms unchanged. If you need to process a pattern which contains a number, you'll need to add other characters around the search or replacement string, using the normal Spectrum string-handling commands.

```
 120 CLEAR 29999
 130 LET c=-26434
 140 FOR i=30000 TO 30224
 150 READ a
 160 LET c=c+a
 170 POKE i,a
 180 NEXT i
 190 IF c THEN  PRINT "DATA ERRO
R": STOP
 200 SAVE "Megasearch"CODE 30000
,225
 210 SAVE "Megasearch"
1000 DATA 42,75,92,126,254,83,40
,14
1010 DATA 254,128,40,6,205,184,2
5,235
1020 DATA 24,241,207,1,207,25,35
,126
1030 DATA 183,40,249,35,126,183,
32,244
1040 DATA 35,229,221,225,42,75,9
2,126
1050 DATA 254,82,40,10,254,128,4
0,226
1060 DATA 205,184,25,235,24,241,
35,34
1070 DATA 174,92,35,126,183,32,2
13,237
1080 DATA 91,83,92,27,19,19,19,2
37
1090 DATA 83,172,92,19,19,213,22
1,70
1100 DATA 254,221,229,225,26,190
,32,103
1110 DATA 35,19,16,248,42,174,92
,126
1120 DATA 221,150,254,40,73,48,4
4,237
1130 DATA 68,79,42,172,92,94,35,
86
1140 DATA 235,183,237,66,235,114
,43,115
1150 DATA 221,229,225,237,66,229
,221,225
1160 DATA 42,174,92,237,66,34,17
4,92
1170 DATA 225,229,205,232,25,24,
31,24
1180 DATA 188,24,177,79,213,42,1
72,92
1190 DATA 94,35,86,235,9,235,114
,43
1200 DATA 115,221,9,42,174,92,9,
34
1210 DATA 174,92,225,205,85,22,2
09,42
1220 DATA 174,92,6,0,78,121,183,
40
1230 DATA 8,35,35,237,176,24,2,2
09
1240 DATA 19,62,127,219,254,31,5
6,2
1250 DATA 207,20,42,75,92,183,23
7,82
1260 DATA 216,26,254,13,40,187,2
54,14
1270 DATA 32,181,33,6,0,25,235,2
4
1280 DATA 233
```

If you haven't got an assembler or Hex loader to hand, just type in the Basic listing of *Multisearch* given above and let the data statements work their magic.

```
9990 CLEAR : LET v=0: PRINT "Loo
k for (N)umber or (T)ext?": GO S
UB 9993: LET s$=a$
9991 PRINT "Replace with (N)umbe
r or (T)ext?": GO SUB 9993: LET
r$=a$
9992 RANDOMIZE USR 30000: STOP :
 REM 30000 is the CODE address
9993 PAUSE 0: LET b$=INKEY$: IF
b$<>"N" AND b$<>"T" AND b$<>"n"
AND b$<>"t" THEN  GO TO 9993
9994 INPUT "Enter data ";a$: IF
b$="T" OR b$="t" THEN  RETURN
9995 LET v=VAL a$: LET a$=a$+CHR
$ 14: LET i=PEEK 23627+256*PEEK
23628: FOR j=i+1 TO i+5: LET a$=
a$+CHR$ PEEK j: NEXT j: RETURN
```

Once you've got *Multisearch* up and running, use this short routine to get the show on the road!

You can use the 'binary form' program as a subroutine if you replace the STOP in line 9902 with a RETURN and get rid of the CLEAR statement in line 9900. However you *must* make sure that V is the first variable encountered when your program is RUN. The routine finds the binary form of a number by storing it in variable V, and then PEEKing the first entry in the variable table. If V isn't the first entry you'll get incorrect results.

ASSEMBLER LISTING

Multisearch uses a number of interesting routines and could form the basis of a complete Basic toolkit. The assembly code of the routine, produced by the whizzo new Microdrive version of the Picturesque *Editor Assembler*, is a little more repetitious than it need be, since it's written in relocatable code. This means it'll run anywhere in memory without modification, but also that it can't use any internal subroutine calls, since the location of each subroutine is not fixed.

Broadly speaking, the program can be divided into two sections. The first part (up to the label LINE) is used to find the variables S$ and R$ and check that they contain correct values. The code to find S$ is duplicated to locate R$ — the only difference is the letter of the name and the extra check to make sure that S$ contains at least one character.

At FINDS, the program points HL into the variable area and then looks for a capital 'S'. This indicates the start of the storage allocated to S$, as explained on page 168 of the Spectrum manual. The ROM routine F-VAR is used to step from one entry to the next until the required letter is found, or the end of the table is reached — in which case a 'Variable not found' error is generated.

Strings stored in the variable area are preceded by their length, recorded in two bytes in normal Z80 fashion — low byte first. *Multisearch* can't cope with strings of more than 255 bytes (the code *is* kept simple!) so it generates a 'Parameter error' if the most significant byte of either string length is not zero. If all goes well IX is left pointing to the text of S$.

From NEXT2 onwards the routine looks for R$. The address of the string (a pointer to the length, in this case) is stored at R-LEN, at the end of a Basic work area called MEMBOT. DE is pointed just before the start of the Basic program (as if the Enter at the end of a

previous line had just been reached) and the main loop through the program begins at LINE.

At LINE the routine expects the end of a line and the start of a new one. It skips over three bytes — the Enter and line number — and stores a pointer to the line length in L-LEN. We need to know where the line length is recorded since we may need to alter it if we add or delete characters in the line.

FIND is the point at which *Megasearch* tries to locate the search string. DE is saved, so that we know where the match did (or didn't) occur, and then the loop at MATCH is used to see if the characters from DE onwards match those from IX onwards. Register B contains the length of S$. If the comparison fails before B reaches zero, the program leaps off to GO-ON, but if all goes well, the length of R$ is fetched and compared with that of S$. If the two are the same, execution continues at NO-OK (pronounced 'number OK'!) — otherwise some characters must be inserted or deleted so that the replacement text fits in the line.

The job of adding or removing characters is not trivial, since any change in the program size also alters the location of variables, and other useful pieces of information. Luckily, ROM routines exist to adjust the program size and make sure that nothing gets lost. SHRNK and XPAND remove or add BC characters at the location pointed to by HL. XPAND produces an 'Out of memory' error if there's no room for the extra characters.

If S$ and R$ are different lengths then *Multisearch* must adjust the line length (as explained earlier) and alter the pointers to S$ and R$. Any movement of the program also sends the variables skidding around memory, since they're stored at the end of the program. This took a little while to puzzle out when we tested the machine code!

A couple of extra jumps are located between the Delete and Insert instructions — the main loop is too long to be traversed in a single relative jump (it can only cross 126 bytes at one mighty bound) so FINDX and LINEX are used as 'staging posts' on the way to FIND and LINE respectively.

Various paths meet at NO-OK. At this point a correct match has been found and the address on the stack points to the place where R$ must be stored. An LDIR is used to copy the new text into the program. This leaves DE pointing to the character after the new data, from whence the search can re-start. If S$ didn't match the program we have to advance DE and start again one byte further through the program. This step is performed at GO-ON.

Whether or not a match was found, we end up at NEXT, where the Break key is polled in case the user has decided to give up. The routine stops with a BREAK error if bit zero at port address 32766 (the Space key) is reset. At CONT the contents of the system variable VARS are compared with the address in DE. If DE is pointing into the variable area we've finished, and the routine RETurns. Otherwise we must look further through the program, although before that we check for a couple of 'special cases'. If DE points to an 'ENTER' character we've reached the end of a line, so we should pick up the new line length by looping back to LINE.

If DE points at a number marker — CHR$ 14 — we must skip over the binary data since it could contain values which appear to be text or keywords, but aren't really. This doesn't stop us finding numbers, since those will always start with an ASCII character (probably a digit). If we've reached the CHR$ 14 we've gone too far.

POSSIBLE IMPROVEMENTS

There are lots of ways in which *Multisearch* could be improved, but the existing code works and it doesn't take long to type in! It might be useful to make it return a count of the number of replacements found, and perhaps a list of the lines in which changes were made. It would be convenient (but perhaps rather difficult) to re-code the 'binary form' program in machine code.

As it stands, *Multisearch* is a simple but very effective routine with a multiplicity of uses. There can't be many short routines which can be used to make ZX Basic edit-proof, faster, more concise, more readable, and more versatile. Do let me know what you make of *Multisearch.* YS

A wealth of Peripherals for your Spectrum!

By RICK BRAVO

Since the 48K Spectrum was launched the opportunities it offered has attracted peripheral manufacturers throughout the world.

One of these manufacturers was bound to emerge as the ''brand leader'' and in the case of the Spectrum this turned out to be DK'tronics. The company is based in Saffron Walden in Essex and proudly boasts a history dating back to the ZX80. All the company's products are manufactured in England at their own factory and they have now established themselves as world leaders, exporting to over 30 countries.

Below you will find a review of their range which now includes over 16 products, all of which are available for the Spectrum and Spectrum + models.

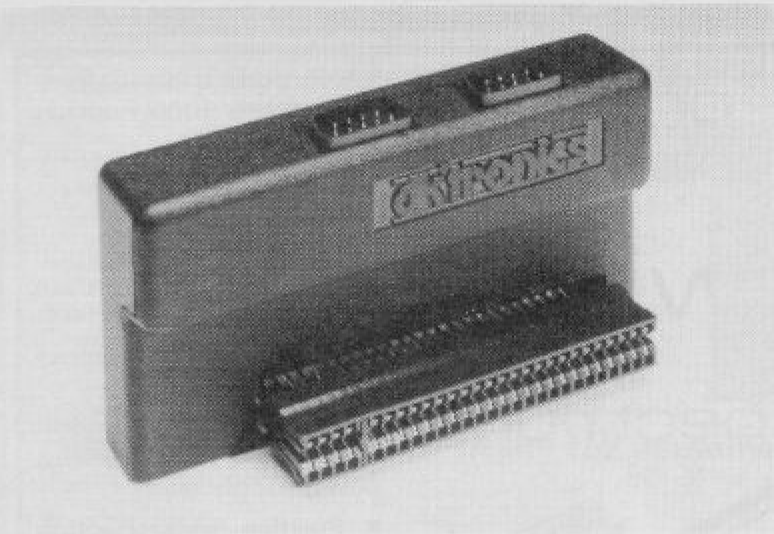
Keyboard

The DK Microdrive Compatible Keyboard is the best selling keyboard in the world and is now used by around 10% of all U.K. Spectrum owners. It is microdrive compatible and offers more key functions than any other keyboard in its price range. The stepped keys and space bar make it even easier to use. It is constructed from high density black ABS and has 52 keys and a full width space bar. A separate numeric keypad of 12 red keys including single entry 'delete' plus single entry 'decimal point' facilitate fast numeric data entry.

From good computer shops everywhere at only £37.50 or direct from DK'tronics, add £1.50 post & packing.



Dual Port



The first port simulates 6,7,8,9, & 0 Keys. The second port simulates in (31) command.

The port will accept any Atari style joystick.

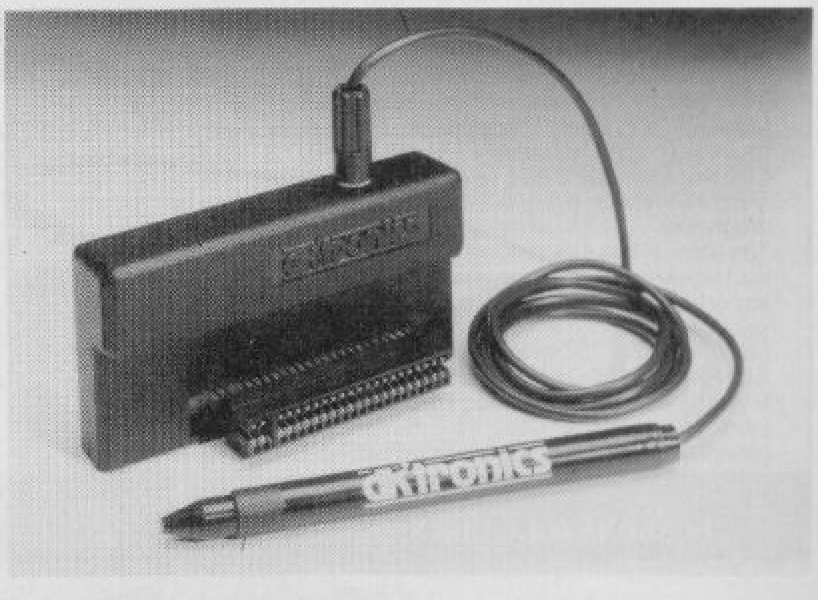
It will run any software. That is:-

(a) Using Keys 6,7,8,9 & 0.
(b) Having redefinable key instructions.
(c) Using in (31) (i.e. Kempston).

This Dual Port interface interconnects with the existing range of DK'tronics products to form the most comprehensive range of Spectrum peripherals available from any manufacturer.

From good computer shops everywhere at only £13.00 or direct from DK'tronics, add £1.50 post & packing.

Light Pen



This highly successful Light Pen for the Sinclair Spectrum plugs neatly onto the rear of the Computer or the rear of the printer connector. The operating software now runs faster and supports 16 pre-defined instructions. You can change all the colours (Border, Paper, Ink), draw circles, arcs, boxes, lines and insert text onto the screen (ideal for diagrams etc.) Save & load completed or partly completed screens onto or from the tape.

There are also features to draw Free Hand and animate on the 48K Spectrum, you can retain and animate 5 screens.

You can also use the machine code on its own in your own programs for selecting out of a menu, playing games etc. All entry points necessary are given. The Pen works down to pixel level with pixel accuracy.

From good computer shops everywhere at only £19.95 or direct from DK'tronics, add £1.50 post & packing.

From **dk'tronics®** Saffron Walden, Essex CB11 3AQ tel:(0799)26350

3 Channel Sound Synthesizer

Any microcomputer is capable of manufacturing sound, however, in order to produce a single octave 'C' note with a frequency of 8372Hz the signal needs attention over 16,000 times per second.

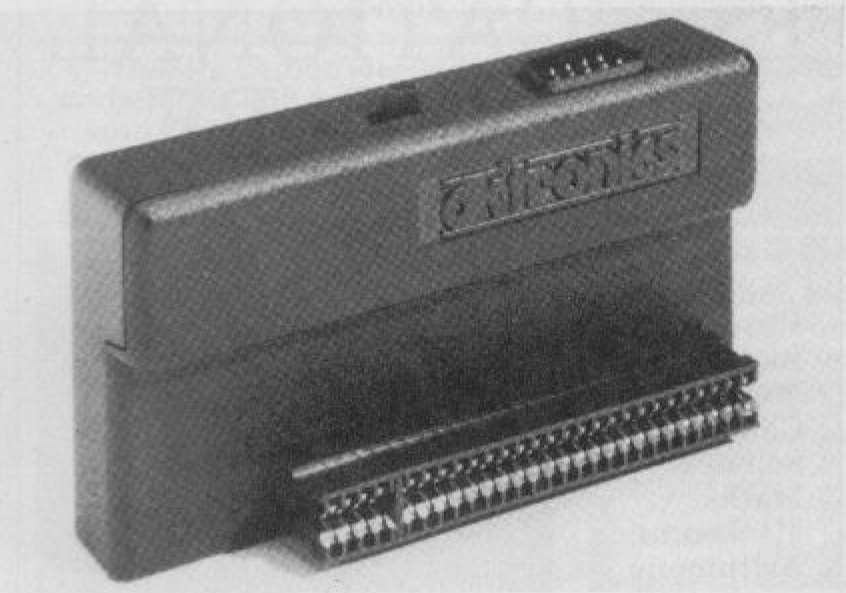
To produce software capable of perfoming just this one task would be difficult if not impossible, especially when you consider that to produce arcade type sound effects requires even greater attention.

The production of these sound effects without the constant attention of the processor is now possible thanks to the AY Sound Chip, its flexibility makes it essential for a wide range of applications including music synthesis and sound effects generation, continuing the monitoring and production of sound after the initial command.

More often than not realistic sounds require more than one effect and this function is provided by 3 independently controlled channels, as an example compare the sound produced by the single note of 'C'with that produced by the chord 'C' and you will know just what I mean, likewise producing the sound of an explosion using all 3 channels gives games a totally new dimension.

Add to this the ability to alter the pitch tone and shape of the sound you have produced and it's flexibility is unlimited. In simple terms, imagine the note you have produced as a calm sea, by altering the pitch and shape you can produce waves, the top of the wave corresponds with the maximum volume and pitch of the note, which like the wave itself rises and falls.

Programmable



At last! A fully programmable joystick interface with feed through connector that really works!

Now you can run ANY software from ANY supplier with the DK'tronics fully programmable joystick interface. It comes complete with machine code software and can be programmed in seconds to give full 8 directional joystick movements plus five capabilities and will accept any Atari/Quickshot type joystick. A catalogue is now available showing the full range of products available from DK'tronics the world's leading Spectrum peripheral manufacturer. The through connector enables other add-ons to be plugged into the rear.

From good computer shops everywhere at only £22.95 or direct from DK'tronics, add £1.50 post & packing.



Speech Synthesizer

The speech synthesizer uses the popular SL0/256 speech chip and has an almost infinite vocabulary. It is supplied with a text to speech converter for ease of speech output creation. Everything you wish to be spoken is entered in normal English, without special control codes or characters, it is therefore extremely easy to use. The voicing of the words is completely user transparent and the computer can carry on its normal running of a program while the speech chip is talking.

Although there are only 26 letters in the alphabet, letters have a totally different sound when used in different words. For example, the "a" in Hay is much longer and softer than in Hat. When you speak you automatically make adjustments because you know just how a word should sound. Not quite so easy with a computer. After looking at other speech synthesizers we decided that it was essential that the DK'tronics Spectrum Speech would offer a simple system that would enable the user to produce realistic speech that was instantly recognisable.

The solution to the problem was extremely complicated, it required hours of programming to enable the computer to look at the individual letters that make up each word and compare their relative position to each other before deciding on the appropriate sound.

I consider this to be the best Spectrum Speech Synthesizer on the market. From good computer shops everywhere at only £24.95 or direct from DK'tronics, add £1.50 post & packing.

Centronics

The new Dk'tronics Parallel Centronics Interface will link your Spectrum to any printer with a standard centronics input. As the choice is vast, you can select the printer exactly suited to your needs.

Features of the interface include: Runs all parrallel centronics type printers: Controlling software fully relocatable; Interfaces with any software using the printer channel e.g. Tasword Dev Pack etc; LList Lprint recognised. High res screen dumps; All control codes allowed through to printer; Fully microdrive compatible.

Supplied with full instructions and controlling software. From good computer shops everywhere and sensibly priced at only £39.95 or direct from DK'tronics, add £1.50 post & packing.

OK, in this month's competition, we're going to ask you to do a bit of day-dreaming. Remember the excitement you felt when you first heard that Uncle Clive had hatched up another computer ... and it was based on the Spectrum? And then the let-down, when you eventually heard about the Spectrum+. Well, all we want you to do is have a look at the list of ten attributes we at *YS* thought would make the Spectrum+ a world-beater ... and put them in the right order of importance.

Of course, there's no such thing as a 'right' or 'wrong' order — especially since the Spectrum+ is out, and it's nothing like we hoped it would be. So, what we've done is to get a certain somebody you'll all have heard of to make up the definitive order. And who's that special person? Yes, it's none other than that Sinclair Research spokesperson we're always quoting (*Well, he needs some publicity too! Ed.*).

THE GOODS

Competitions wouldn't be much fun if there wasn't an amazing prize for the winner ... and that's why our first prize is a £500 voucher — to be spent on any Spectrum peripherals or software only, in one of the well known UK chain stores selling Spectrum equipment. Not only that, but there'll be five £100 vouchers for the following five correct coupons picked out of a hat at random!

All you have to do is fill in the coupon, giving us your name and address, together with the order you think the imaginery Spectrum+ attributes should be in. Then, bung it in an envelope and address it to: Spectrum UK Competition, Your Spectrum, 14 Rathbone Place, London W1P 1DE.

There's £1,000 worth of peripherals and software to be won for the ZX Spectrum — courtesy of Spectrum UK and Your Spectrum *magazine*.



SPECTRUM RULES OK!

- Entries for the Spectrum UK competition must have a post date of not later than 31st March, 1985.
- Each entry must have the coupon filled in correctly; bad language and illiteracy will be treated with the respect they deserve.
- The Editor's decision is final, and no correspondence will be entered into with regard to the results of the competition.

COMPETITION!

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YOUR SPECTRUM

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£500!

worth of peripherals/software!

Only when hell freezes over, will there be any chance of Sinclair Research coming up with a Spectrum-based micro with this lot on-board ... but if it did, I reckon I'd put its attributes in the following order of importance:

Pixel colour resolution mode	......	User-defined function keys	......
Joystick ports	......	Centronics parallel interface	......
Built-in Interface 1 and Microdrive	......	Built-in cassette unit	......
Sound synthesis chip	......	RGB monitor output	......
Built-in power supply and 'on/off' switch	......	Software-compatibility to the ZX Spectrum	......

Name ....

Address..

....

....

.... Postcode........................

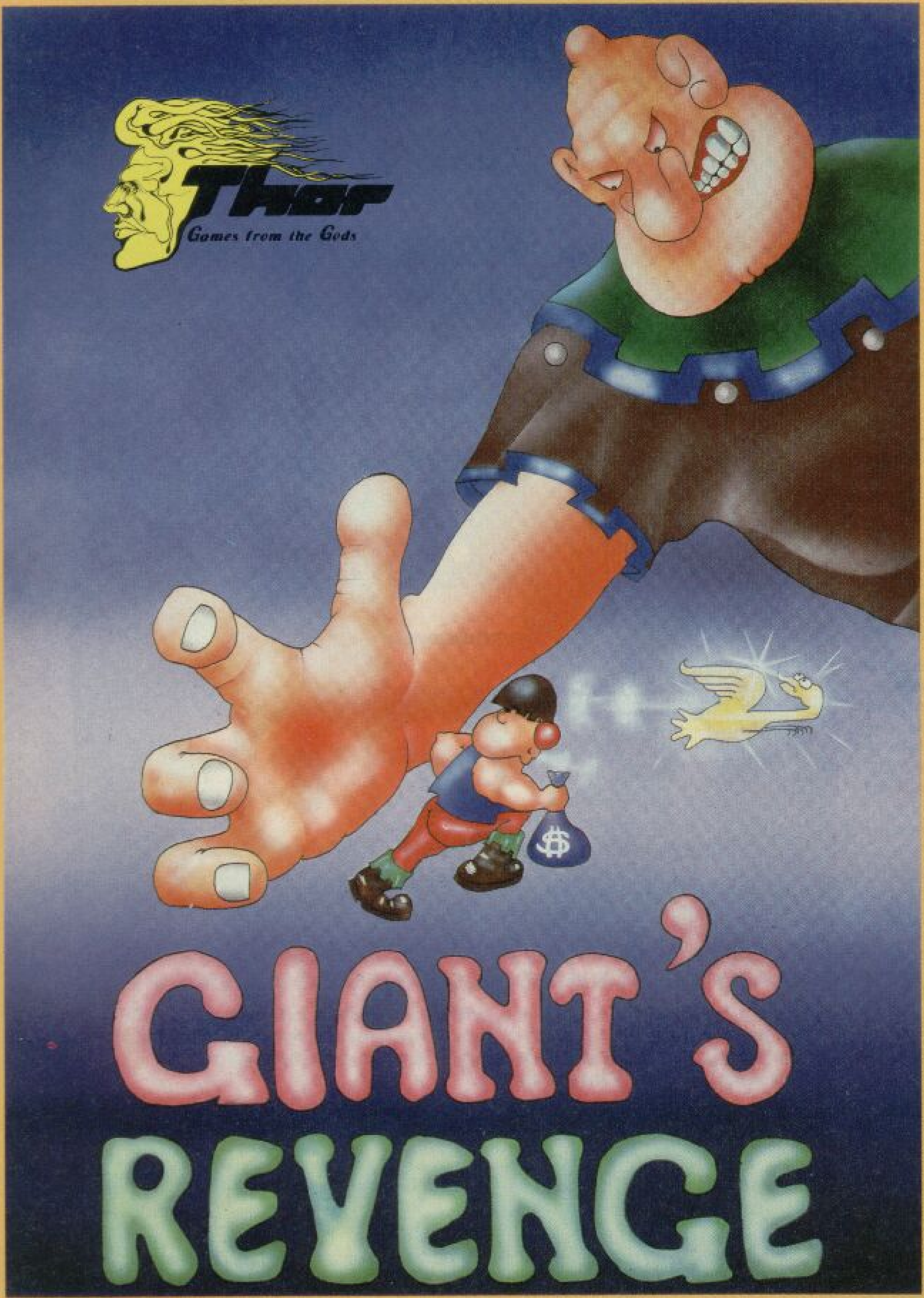
Post this completed coupon (or a photocopy of same) to **Spectrum UK Competition, *Your Spectrum*, 14 Rathbone Place, London W1P 1DE.**

MAGAZINE HEALTH WARNING
The use of scissors on this page can be hazardous to the magazine's health. Please use a photocopy instead.

HERE WE GO AGAIN

Sequel to No 1 Game Jack and The Beanstalk

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by CHRIS KERRY



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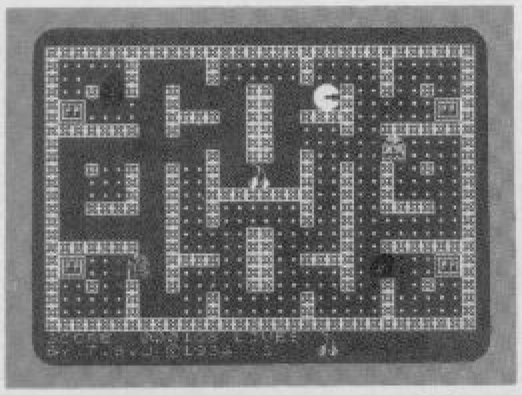
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PROGRAM POWER

Your Spectrum *is proud to present an amazing 100 per cent machine code game written by* **Stuart Jamieson.** *All programming contributions should be sent to Gavin Monk, Program Power,* **Your Spectrum,** *14 Rathbone Place, London W1P 1DE.*

MAC MAN

BY STUART JAMIESON



Is Mr Mac a hypochondriac? All he wants to do is munch his way through all those pills...that's if the ghosts don't get him first!

Following the success of our first 100 per cent machine code program *Stampabout* (*YS* issue 8) now try this one for size! Again it's based on an old favourite — but it's certainly one of the best *Pac-Man* clones we've seen here at *YS*!

Before giving you the details of the game *(Only hermits won't know what it's all about! Ed.)*, here's how you get that code into your Speccy. First type in the machine code loader and SAVE it to tape. Next type in the Hex loader program and RUN it. It'll accept eight bytes at a time (without spaces) and then ask for a checksum (which is given after the eight Hex pairs). You'll then be asked to SAVE the code *after* the short loader program. This done, reset the Spectrum, rewind the tape to the beginning, enter LOAD"" and press the Play button on your cassette machine. It's as easy as that!

On now to the game itself. Quite simply, you have to control the hero, Mr Mac, around the maze collecting the pills as you go and avoiding the four distinctly unfriendly ghosties. Don't be daunted though! Eating the power pills you'll find in the four corners of the maze will enable you to turn the tables on the ghosties and let you eat them instead — but only when they've turned green, so you'll have to be fast as they don't stay that colour for long!

This excellent version of the arcade classic uses ultra-amazing double-size graphics and smooth animation throughout. If you manage to progress beyond the first 'cherry' level, you'll get to 'strawberry' level and that's as far as we at *YS* have managed to get! But there's lots more...

Controls for the game are simple and easy to use. Just press the 'Q' key to go up, the 'A' key to go down and the 'P' key to move right and the 'O' key for left.

Happy munching!

```
   1 BORDER 0: PAPER 0: INK 0: CLS
  10 CLEAR 26289
  20 PRINT AT 10,6; FLASH 1; INK 1; PAPER 7;
BRIGHT 1;"MAC MAN!  IS LOADING"
  30 LOAD ""CODE
  40 PRINT USR 26490
  50 STOP
```

This is the short loader program that you'll need to type in and SAVE to tape.

```
   1 REM HEX Loader for Macman
   5 POKE 23658,8
   9 CLEAR 26489
  10 FOR i=26490 TO 26490+4624 STEP 8
  20 LET cs=0
  30 PRINT AT 0,0;"Address ";i
  40 INPUT "Hex 8 Bytes", LINE a$
  50 IF a$="0" THEN  LET a$="0000000000000000
"
  60 IF LEN a$<>16 THEN  GO TO 1000
  80 LET f=0: FOR j=1 TO 16
  90 IF (a$(j)<"0" OR a$(j)>"9") AND (a$(j)<"
A" OR a$(j)>"F") THEN  LET f=1
 100 NEXT j
 105 FOR N=0 TO 7
 110 IF f=1 THEN  GO TO 1000
 120 LET y=CODE a$(1)-48: IF y>9 THEN  LET y=
y-7
 130 LET z=CODE a$(2)-48: IF z>9 THEN  LET z=
z-7
 140 LET va=16*y+z
 150 LET cs=cs+va
 160 POKE i+n,va
 165 PRINT AT 2,n*3;a$( TO 2)
 170 LET a$=a$(3 TO )
 180 NEXT n
 183 INPUT "Checksum "; LINE a$
 184 PRINT AT 2,25;A$
 185 IF VAL a$<>cs THEN  GO TO 1000
 187 CLS
 190 NEXT i
 200 CLS : PRINT "SAVE CODE AFTER BASIC LOADE
R."''"REMOVE EAR LEAD"
 210 SAVE "MACMAN"CODE 26490,4624
 220 CLS : PRINT "VERIFYING"
 230 VERIFY ""CODE
 240 CLS : PRINT "ALL OK": STOP
1000 PRINT AT 15,0;"ERROR": GO TO 20
```

Once you've SAVEd the loader program, reset the Spectrum and type in the Hex loader program and RUN it. The program will ask for eight bytes at a time from the main machine code listing and then, finally, the checksum at the end of each line. When you've typed in all the code, SAVE it to tape after the short loader program. Now rewind the tape, reset the Spectrum, type LOAD "" and start the tape.

Here's the Hex code that you'll need to type into the Spectrum using the Hex loader given above.

```
26490 3E 07 32 48 5C 32 8D 5C =566
26498 32 8E 5C 32 BF 5C 32 90 =763
26506 5C AF D3 FE 21 00 40 11 =846
26514 01 40 36 00 01 00 18 ED =381
26522 B0 21 00 58 11 01 58 36 =457
26530 07 01 00 03 ED B0 CD C2 =823
26538 67 3E F7 DB FE CB 47 C8 =1359
26546 3E BF DB FE CB 47 CC 78 =1324
26554 69 06 C8 76 10 FD 18 CC =926
26562 11 CD 76 0E EE 06 27 CD =812
26570 68 75 21 28 68 01 0E 01 =414
26578 C5 E5 C5 06 08 C5 CD 01 =1040
26586 68 C1 10 F9 C1 E1 7E 23 =1141
26594 E5 CD 36 69 E1 3E F7 DB =1346
26602 FE CB 47 28 10 3E BF DB =1056
26610 FE CB 47 28 0B C1 0B 78 =900
26618 B1 20 D5 18 CD C1 C9 21 =1078
26626 1F 50 CD 0E 6B 21 3F 50 =610
26634 CD 0E 68 C9 06 0B C5 E5 =964
26642 CD 1B 68 E1 24 C1 10 F6 =1052
26650 C9 01 20 00 09 06 20 7E =407
```

```
26658 17 77 2B 10 FA C9 20 4D =761
26666 41 43 4D 41 4E 20 57 52 =553
26674 49 54 54 45 4E 20 42 59 =575
26682 20 53 54 55 41 52 54 20 =547
26690 4A 41 4D 49 45 53 4F 4E =598
26698 20 7F 31 39 38 34 20 2E =451
26706 20 47 55 49 44 45 20 4D =507
26714 41 43 20 4D 41 4E 20 52 =498
26722 4F 55 4E 44 20 54 48 45 =567
26730 20 4D 41 5A 45 53 20 45 =517
26738 41 54 49 4E 47 20 54 48 =559
26746 45 20 44 4F 54 53 20 28 =487
26754 31 20 50 4F 49 4E 54 20 =507
26762 45 41 43 48 29 20 41 4E =489
26770 44 20 46 52 55 49 54 20 =526
26778 28 31 30 30 20 50 4F 49 =449
26786 4E 54 53 20 31 53 54 20 =525
26794 4C 45 56 45 4C 20 32 30 =506
26802 30 20 50 4F 49 4E 54 53 =557
26810 20 32 4E 44 20 4C 45 56 =491
26818 45 4C 20 45 54 43 29 20 =470
26826 2E 20 49 46 20 48 45 20 =426
26834 45 41 54 53 20 41 20 50 =510
26842 4F 57 45 52 20 50 49 4C =578
26850 4C 20 48 45 20 43 41 4E =491
26858 20 45 41 54 20 54 48 45 =507
```

```
26866 20 47 48 4F 53 54 53 20 =536
26874 2E 20 27 51 27 20 55 50 =434
26882 20 27 41 27 20 44 4F 57 =441
26890 4E 20 27 4F 27 20 4C 45 =444
26898 46 54 20 27 50 27 20 52 =458
26906 49 47 48 54 20 50 52 45 =563
26914 53 53 20 45 4E 54 45 52 =580
26922 20 54 4F 20 42 45 47 49 =506
26930 4E 20 2E 20 A7 D6 20 47 =672
26938 21 00 3D 11 08 00 A7 28 =326
26946 03 19 10 FD 11 3F 50 CD =662
26954 4D 69 C9 CD 54 69 CD 54 =1066
26962 69 C9 D5 06 04 7E 12 14 =693
26970 12 14 23 10 F8 D1 E5 D5 =988
26978 E1 CB 1C CB 1C CB 1C 01 =919
26986 20 00 09 CB 14 CB 14 CB =690
26994 14 E5 D1 E1 C9 E1 F3 CD =1557
27002 B0 6B CD 0E 6A CD 97 6B =1071
27010 CD 53 6C CD 76 6C CD 30 =1080
27018 6B CD 78 71 CD EC 6C 3A =1152
27026 FD 78 A7 28 04 CD DC 6B =1116
27034 3D 32 FD 78 3A 01 79 FE =918
27042 78 CC 0E 6A 3A 01 79 FE =878
27050 FF 20 DB CD 13 6C AF 32 =1063
27058 01 79 CD EF 6B 3A 0C 79 =864
27066 3D A7 28 0B 32 0C 79 CD =667
```

PROGRAM POWER

```
27074 D0 6A CD 53 6C 1B BF 3E =987
27082 03 32 0C 79 AF 32 01 79 =533
27090 32 0E 79 21 90 01 22 0F =412
27098 79 32 0D 79 3D 32 0A 79 =547
27106 01 00 3C ED 43 36 5C DD =732
27114 21 98 75 06 04 11 03 00 =332
27122 DD 36 00 01 DD 19 10 F8 =786
27130 AF 21 02 79 77 23 77 23 =639
27138 77 32 06 79 32 07 79 32 =524
27146 08 79 FB C9 CD 13 6C AF =1088
27154 32 01 79 32 0E 79 21 90 =534
27162 01 22 0F 79 3A 0A 79 3C =420
27170 FE 06 20 01 AF 32 0A 79 =649
27178 CB 2F 32 0D 79 CD 66 6A =847
27186 CD D0 6A 3A 0A 79 21 D4 =953
27194 50 CB 27 A7 28 04 23 3D =629
27202 20 FC E5 3A 0A 79 21 2D =780
27210 78 A7 28 07 11 20 00 19 =408
27218 3D 20 FC E5 D1 E1 CD 94 =1361
27226 74 CD 06 6B 11 00 3C ED =748
27234 53 36 5C C9 21 A7 75 11 =764
27242 62 00 3A 0D 79 A7 28 04 =501
27250 19 3D 20 FC 11 ED 7B 01 =745
27258 08 00 ED B0 11 ED 7B 15 =816
27266 ED 53 36 5C E5 3E 16 D7 =994
27274 AF D7 AF D7 3E 10 D7 AF =1248
27282 D7 3E 11 D7 AF D7 E1 AF =1299
27290 32 3C 5C 7E 06 58 C5 06 =625
27298 08 C5 CB 7F C4 C0 6A CB =1232
27306 7F CC C8 6A CB 27 C1 10 =1088
27314 F0 23 7E C1 10 E8 5E 23 =971
27322 56 ED 53 FF 78 C9 F5 E5 =1456
27330 3E 20 D7 E1 F1 C9 F5 E5 =1450
27338 3E 21 D7 E1 F1 C9 21 A7 =1177
27346 75 3A 0D 79 A7 28 07 11 =540
27354 62 00 19 3D 20 FC 11 08 =493
27362 00 19 7E 06 58 11 00 58 =350
27370 C5 06 08 C5 CB 7F EB 28 =1013
27378 04 36 05 18 02 36 06 CB =352
27386 27 EB 13 C1 10 ED C1 23 =967
27394 7E 10 E5 C9 AF 32 FD 7B =1170
27402 DD 21 98 75 11 03 00 06 =549
27410 04 C5 D5 11 0D 78 DD 36 =839
27418 00 01 DD 46 01 DD 4E 02 =594
27426 0C CD AA 22 CD 94 74 D1 =1099
27434 C1 DD 19 10 E4 C9 3A 0E =956
27442 79 A7 20 15 2A 0F 79 2B =562
27450 22 0F 79 7C B5 28 01 C9 =717
27458 3E FF 32 0E 79 CD 7D 6B =939
27466 C9 3A 0E 79 3D 32 0E 79 =640
27474 A7 28 1A 21 82 79 7E C6 =841
27482 F8 FE 77 C0 23 7E C6 08 =1180
27490 FE 67 C0 3A 0A 79 3C 32 =848
27498 07 79 CD 76 6C AF 32 0E =798
27506 79 21 90 01 22 0F 79 CD =674
27514 7D 6B C9 06 67 0E 77 3A =733
27522 0A 79 11 20 00 21 2D 78 =378
27530 A7 28 04 19 3D 20 FC E5 =810
27538 D1 CD 68 75 C9 06 FA 11 =1109
27546 0A 00 21 00 01 C5 E5 D5 =683
27554 CD B5 03 F3 D1 E1 01 FF =1322
27562 FF 09 C1 10 F0 C9 11 C0 =1123
27570 50 21 11 79 06 40 C5 E5 =747
27578 7E CD C4 6B E1 23 C1 10 =1103
27586 F5 C9 47 D5 11 08 00 21 =788
27594 00 3C 19 10 FD D1 D5 06 =782
27602 08 7E 23 12 14 10 FA D1 =682
27610 13 C9 3A FD 78 E6 0F 67 =999
27618 2E 00 11 01 00 CD B5 03 =453
27626 F3 3A FD 78 C9 06 28 11 =938
27634 02 00 21 E8 03 CD 02 6D =585
27642 06 0A 11 28 00 21 64 00 =206
27650 C5 E5 D5 CD B5 03 F3 D1 =1480
27658 E1 01 FA FF 09 C1 10 F0 =1189
27666 C9 DD 21 91 79 DD 4E 02 =1022
27674 DD 46 03 DD 5E 04 DD 56 =920
27682 05 CD 68 75 DD 21 9B 79 =961
27690 06 04 C5 DD 5E 04 DD 56 =833
27698 05 DD 4E 02 DD 46 03 CD =805
27706 68 75 C1 11 0A 00 DD 19 =687
27714 10 E8 21 91 79 11 91 79 =830
27722 01 32 00 13 36 00 ED B0 =537
27730 C9 3A 0C 79 21 F0 50 22 =779
27738 52 79 CD C7 6C C9 E5 2A =1187
27746 FF 78 2B 7C B5 20 08 3E =825
27754 78 32 01 79 21 00 00 22 =359
27762 FF 78 E1 C9 21 C7 50 22 =1147
27770 52 79 21 06 79 DD 21 02 =619
27778 79 DD 7E 02 86 27 DD 77 =983
27786 02 DD 7E 01 23 8E 27 DD =787
27794 77 01 DD 7E 00 23 8E 27 =683
27802 DD 77 00 DD E5 E1 7E E5 =1370
27810 CD BE 6C E1 23 7E E5 CD =1323
27818 BE 6C E1 23 7E CD BE 6C =1187
27826 21 06 79 36 00 23 36 00 =303
27834 23 36 00 C9 F5 0F 0F 0F =580
27842 0F CD C7 6C F1 E6 0F D5 =1226
27850 11 08 00 21 80 3D A7 28 =454
27858 04 19 3D 20 FC ED 5B 52 =784
27866 79 06 08 7E 12 14 23 10 =350
27874 FA 2A 52 79 23 22 52 79 =767
27882 D1 C9 11 0A 00 AF 32 87 =797
27890 79 DD 21 9B 79 DD 7E 01 =999
27898 A7 CC 10 6D 06 04 C5 D5 =916
27906 CD C8 6D 21 87 79 34 D1 =1067
27914 DD 19 C1 10 F1 C9 21 54 =1014
27922 79 11 9B 79 01 28 00 ED =692
27930 B0 11 0A 00 C9 DD 36 01 =680
27938 FF DD 4E 02 DD 46 03 DD =1071
27946 5E 04 DD 56 05 CD 68 75 =936
27954 C9 C5 D9 ED 43 A5 75 D9 =1418
27962 D5 CD AA 22 7C 0F 0F 0F =791
27970 E6 03 F6 58 67 3A FD 78 =1101
27978 A7 20 1D E5 3A 87 79 47 =842
27986 21 7E 79 A7 28 03 23 10 =541
27994 FD 4E E1 E5 C5 CD 2E 6E =1343
28002 C1 E1 CD 77 6D D1 C1 C9 =1454
28010 E5 CD 2E 6E E1 0E 04 CD =1038
28018 77 6D D1 C1 C9 E5 E5 FD =1542
28026 E1 3E 05 FD BE 00 28 03 =778
28034 FD 71 00 FD BE 01 28 03 =853
28042 FD 71 01 FD BE 02 28 03 =855
28050 FD 71 02 FD BE 20 28 03 =886
28058 FD 71 20 FD BE 22 28 03 =918
28066 FD 71 22 FD BE 21 28 03 =919
28074 FD 71 21 FD BE 40 28 03 =949
28082 FD 71 40 FD BE 41 28 03 =981
28090 FD 71 41 FD BE 42 28 03 =983
28098 FD 71 42 FD 21 3A 5C E1 =1093
28106 C9 DD 7E 01 A7 CC 1F 6D =1060
28114 DD 4E 02 DD 46 03 DD 5E =910
28122 04 DD 56 05 D5 C5 D9 C1 =1136
28130 D1 D9 CD 17 6F 79 DD 86 =1241
28138 06 4F 78 DD 86 07 FE FF =1076
28146 38 02 3E AF FE B0 38 02 =783
28154 3E 01 47 DD 71 02 DD 70 =803
28162 03 DD 7E 08 A7 28 02 3E =629
28170 FF 3C DD 77 08 DD 7E 0B =1018
28178 11 20 00 21 CD 77 A7 28 =613
28186 01 19 E5 D1 DD 73 04 DD =1025
28194 72 05 CD 33 6D CD 9B 6E =954
28202 CD B9 74 C9 ED 4B A5 75 =1301
28210 CD AA 22 7C 0F 0F 0F E6 =808
28218 03 F6 58 67 E5 E5 FD E1 =1376
28226 3E 05 FD BE 00 28 04 FD =807
28234 36 00 06 FD BE 01 28 04 =548
28242 FD 36 01 06 FD BE 02 28 =799
28250 04 FD 36 02 06 FD BE 20 =794
28258 28 04 FD 36 20 06 FD BE =832
28266 22 28 04 FD 36 22 06 FD =678
28274 BE 21 28 04 FD 36 21 06 =613
28282 FD BE 40 28 04 FD 36 40 =922
28290 06 FD BE 41 28 04 FD 36 =865
28298 41 06 FD BE 42 28 04 FD =877
28306 36 42 06 FD 21 3A 5C E1 =787
28314 C9 21 82 79 ED 43 89 79 =1047
28322 CD AA 6E ED 4B 89 79 C9 =1256
28330 E5 C5 7E 91 38 19 79 A7 =1066
28338 C6 10 4F 7E 91 30 10 C1 =821
28346 C5 23 7E 90 30 09 78 C6 =877
28354 F0 47 7E 90 D4 CC 6E C1 =1300
28362 E1 C9 3A FD 78 A7 20 06 =1062
28370 3E FF 32 01 79 C9 ED 4B =1002
28378 89 79 CD D8 72 0E 06 CD =1018
28386 77 6D DD 36 01 FE 06 67 =867
28394 0E 77 ED 43 89 79 DD 71 =1029
28402 02 DD 70 03 DD 36 06 00 =619
28410 DD 36 07 01 21 09 79 3A =504
28418 09 79 CB 27 27 32 09 79 =591
28426 E6 1F 32 07 79 DD E5 CD =1094
28434 76 6C DD E1 C9 79 2F E6 =1271
28442 07 C0 78 2F E6 07 C0 3A =853
28450 FD 78 C2 C8 6F DD 36 00 =1153
28458 00 ED 5F FE 1E D2 C8 6F =1137
28466 C5 CD 2E 71 C1 DD 7E 00 =1101
28474 DD BE 09 C8 21 82 79 CD =1109
28482 50 6F CD 6F 6F CD 8E 6F =1076
28490 CD AB 6F C3 C8 6F 23 7E =1154
28498 C6 08 2B BB CB D8 DD CB =1273
28506 00 46 CB DD 7E 00 E6 01 =848
28514 DD 77 09 DD 36 07 02 DD =854
28522 36 06 00 E1 C9 23 7E C6 =845
28530 08 2B BB CB D0 DD CB 00 =1067
28538 56 C8 DD 7E 00 E6 04 DD =1088
28546 77 09 DD 36 07 FE DD 36 =939
28554 06 00 E1 C9 7E C6 F8 B9 =1189
28562 C8 D8 DD CB 00 4E C8 DD =1339
28570 7E 00 E6 02 DD 77 09 DD =928
28578 36 06 02 DD 36 07 00 E1 =569
28586 C9 7E C6 F8 B9 C8 D0 DD =1587
28594 CB 00 5E C8 DD 7E 00 E6 =1074
28602 08 DD 77 09 DD 36 06 FE =892
28610 DD 36 07 00 E1 C9 DD 36 =983
28618 00 00 C5 CD 2E 71 C1 DD =975
28626 7E 00 32 00 5B DD BE 09 =687
28634 C8 FE 03 CA 12 70 FE 05 =1048
28642 CA 1C 70 FE 09 CA 27 70 =958
28650 FE 06 CA 31 70 FE 0A CA =1089
28658 3B 70 FE 0C CA 46 70 FE =1075
28666 0F CA 50 70 FE 07 CA 66 =974
28674 70 FE 0E CA 79 70 FE 0B =1080
28682 CA 8C 70 FE 0D CA 9F 70 =1194
28690 DD 7E 06 A7 C4 EE 70 CD =1271
28698 1E 71 DD 7E 07 FE FE C4 =1201
28706 EE 70 CD FE 70 DD 7E 06 =1274
28714 A7 C4 EE 70 CD 0E 71 DD =1266
28722 7E 06 A7 C4 FE 70 CD 1E =1096
28730 71 DD 7E 06 FE FE C4 1E =1200
28738 71 CD 0E 71 DD 7E 07 A7 =966
28746 C4 0E 71 CD FE 70 ED 5F =1226
28754 CB 57 28 08 CB 47 CC EE =1054
28762 70 CD FE 70 CB 47 CC 0E =1175
28770 71 CD 1E 71 DD 7E 07 FE =1069
28778 02 CA B2 70 DD 7E 06 FE =1101
28786 FE C2 D0 70 C3 1C 70 DD =1324
28794 7E 07 FE 02 CA DA 70 DD =1142
28802 7E 06 FE FE C2 D0 70 C3 =1349
28810 E4 70 DD 7E 06 FE 02 CA =1151
28818 B2 70 DD 7E 07 FE FE CA =1354
28826 DA 70 C3 C6 70 DD 7E 07 =1189
28834 FE 02 CA 27 70 DD 7E 06 =962
28842 FE FE C2 46 70 C3 1C 70 =1219
28850 ED 5F CB 47 CC EE 70 CD =1365
28858 1E 71 ED 5F CB 47 CC FE =1207
28866 70 CD EE 70 ED 5F CB 47 =1273
28874 CC 0E 71 CD EE 70 ED 5F =1218
28882 CB 47 C4 FE 70 CD 1E 71 =1184
28890 ED 5F CB 47 CC 0E 71 CD =1142
28898 1E 71 ED 5F CB 47 C4 FE =1199
28906 70 CD 0E 71 DD 7E 00 DD =1012
28914 77 09 DD 36 06 00 DD 36 =684
28922 07 02 E1 C9 DD 7E 00 DD =1003
28930 77 09 DD 36 06 00 DD 36 =684
28938 07 FE E1 C9 DD 7E 00 DD =1255
28946 77 09 DD 36 06 FE DD 36 =938
28954 07 00 E1 C9 DD 7E 00 DD =1001
28962 77 09 DD 36 06 02 DD 36 =686
28970 07 00 E1 C9 CD D8 72 DD =1189
28978 36 00 00 FD 22 01 5B 3E =495
28986 05 FD BE 01 28 09 FD BE =941
28994 02 28 04 DD CB 00 C6 FD =921
29002 BE 23 28 09 FD BE 43 28 =824
29010 04 DD CB 00 CE FD BE 61 =1174
29018 28 09 FD BE 62 28 04 DD =855
29026 CB 00 D6 FD BE 20 28 09 =941
29034 FD BE 40 28 04 DD CB 00 =975
29042 DE FD 21 3A 5C C9 DD 21 =1113
29050 91 79 DD 7E 01 A7 CC F0 =1225
29058 71 DD 4E 02 DD 46 03 DD =929
29066 5E 04 DD 56 05 CD 23 72 =764
29074 C5 D5 D9 D1 C1 D9 CD 36 =1505
29082 73 CD A4 72 79 A7 DD 86 =1241
29090 06 4F 78 A7 DD 86 07 FE =988
29098 FF 38 02 3E AF FE B0 38 =1036
29106 02 3E 01 47 C5 DD 7E 08 =688
29114 A7 CB 27 A7 DD 86 09 21 =973
29122 CD 76 A7 28 07 11 20 00 =586
29130 47 19 10 FD E5 D1 DD 73 =1139
29138 04 DD 72 05 C1 DD 71 02 =873
29146 DD 70 03 DD 7E 09 A7 28 =899
29154 02 3E FF 3C DD 77 09 CD =933
29162 2C 74 CD B9 74 C9 DD 36 =1142
29170 00 00 DD 36 01 FF DD 36 =806
29178 02 77 DD 36 03 67 11 CD =724
29186 76 DD 73 04 DD 72 05 DD =1019
29194 36 06 00 DD 36 07 00 DD =563
29202 36 08 02 DD 36 09 00 DD =569
29210 4E 02 DD 46 03 CD 68 75 =800
29218 C9 DD 36 00 00 78 2F E6 =873
29226 07 CC 2C 73 79 2F E6 07 =775
29234 CC 31 73 AF DD CB 00 4E =1045
29242 28 01 3C DD CB 00 56 28 =651
29250 01 3C FE 02 C0 3E FB DB =1041
29258 FE CB 47 CA 88 72 3E FD =1295
29266 DB FE CB 47 CA 96 72 3E =1275
29274 DF DB FE CB 4F CA 6C 72 =1402
29282 3E DF DB FE CB 47 CA 7A =1356
29290 72 C9 3E FE DD 36 08 03 =917
29298 DD 77 06 DD 36 07 00 C9 =829
29306 3E 02 DD 36 08 01 DD 77 =688
29314 06 DD 36 07 00 C9 3E 02 =553
29322 DD 36 08 00 DD 77 07 DD =851
29330 36 06 00 C9 3E FE DD 36 =852
29338 08 02 DD 36 06 00 DD 77 =631
29346 07 C9 79 2F E6 07 CC 78 =925
29354 2F E6 07 C0 C5 CD D8 72 =1208
29362 3E 02 DD BE 06 CC EE 72 =1037
29370 3E FE DD BE 06 CC FB 72 =1302
29378 3E 02 DD BE 07 CC 0D 73 =814
29386 3E FE DD BE 07 CC 1A 73 =1079
29394 C1 FD 21 3A 5C C9 CD AA =1205
```

```
29402 22 7C 0F 0F 0F E6 03 F6 =682
29410 58 67 E5 A7 FD E1 01 E0 =1290
29418 FF FD 09 C9 3E 05 FD BE =1228
29426 23 28 13 FD BE 43 28 0E =658
29434 C9 3E 05 FD BE 20 28 06 =789
29442 FD BE 40 28 01 C9 DD 36 =1024
29450 06 00 C9 3E 05 FD BE 01 =718
29458 28 13 FD BE 02 28 0E C9 =759
29466 3E 05 FD BE 61 28 06 FD =906
29474 BE 62 28 01 C9 DD 36 07 =812
29482 00 C9 DD CB 00 CE C9 DD =1253
29490 CB 00 D6 C9 79 2F E6 07 =1023
29498 C0 78 2F E6 07 C0 C5 CD =1190
29506 3F 74 0C D5 ED 53 8D 79 =986
29514 C5 CD EF 73 A7 C4 A7 73 =1401
29522 79 A7 C6 08 4F ED 5B 8D =1042
29530 79 13 CD EF 73 A7 C4 A7 =1229
29538 73 C1 C5 CD 55 75 CD 55 =1202
29546 75 CD 55 75 CD 55 75 CD =1136
29554 55 75 CD 55 75 CD 55 75 =1016
29562 CD 55 75 ED 5B 8D 79 21 =1030
29570 10 00 19 E5 D1 ED 53 8D =940
29578 79 CD EF 73 A7 C4 A7 73 =1325
29586 79 A7 C6 08 4F ED 5B 8D =1042
29594 79 13 CD EF 73 A7 C4 A7 =1229
29602 73 C1 D1 C1 C9 ED 43 84 =1347
29610 79 C5 D5 11 F5 78 06 08 =927
29618 C5 ED 4B B4 79 CD AA 22 =1171
29626 1A AE 77 ED 4B 84 79 CD =1089
29634 55 75 ED 43 84 79 13 C1 =971
29642 10 E6 C5 3E 10 D3 FE 06 =992
29650 00 D3 FE D3 FE 10 FA AF =1371
29658 D3 FE C1 DD E5 21 06 79 =1268
29666 36 01 CD 76 6C DD E1 CD =1137
29674 60 6C D1 C1 C9 AF 32 B6 =1166
29682 79 C5 CD AA 22 D5 D9 D5 =1370
29690 11 F5 78 D9 06 07 7E D9 =955
29698 EB AE EB D9 EB BE EB CC =1725
29706 25 74 13 13 24 D9 13 D9 =680
29714 10 EC D9 D1 D9 D1 C1 3A =1355
29722 86 79 FE 07 28 02 AF C9 =934
29730 3E 01 C9 E5 21 86 79 34 =833
29738 E1 C9 C5 21 82 79 79 A7 =1195
29746 C6 08 4F 77 23 78 A7 C6 =924
29754 F8 47 77 C1 C9 DD E5 DD =1503
29762 21 98 75 ED 43 B9 79 ED =1101
29770 53 8B 79 06 05 11 03 00 =374
29778 CD 64 74 DD 19 10 F9 ED =1169
29786 4B 89 79 ED 5B 8B 79 DD =1142
29794 E1 C9 DD 7E 00 A7 CB 21 =1173
29802 89 79 7E DD BE 02 C0 23 =1024
29810 7E DD BE 01 C0 DD 36 00 =1005
29818 00 3E 64 32 FD 78 3E 01 =648
29826 32 09 79 C5 D5 ED 4B B9 =1039
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31114 00 00 00 00 00 00 00 00 =0
STOP
```

PROGRAMMING ON SPEC

Here at *Your Spectrum,* we pride ourselves in providing you with the best in software each and every month. And how do we manage this amazing feat ... well, we don't — but *you do!*

A number of programs *are* submitted for publication from readers and, as you've no doubt gathered from past issues, the quality is pretty excellent. But that doesn't mean we don't want to hear from *you — Your Spectrum* is *your* magazine so make use of it. You're one of two million Spectrum users — don't just sit there, write us a program and be famous!

All we're looking for is a bit of originality, a sense of humour and some competent code. (Have a look at Gavin Monk's program in *YS* issue 10 if you're looking to nick some ideas to 'pretty up' your programs.) All we ask is that you don't type up a program from another magazine or book as we always find out in the end and your name will be mud throughout the industry. (Remember the game, *Ground Attack* in *YS* issue 7? Well, the so-called author of that particular game *(We wouldn't want to mention his name because that would be indiscreet ... Anthony Crawford. Ed.)* stole it lock, stock and barrell from a weekly computer magazine; we didn't find out until after it had been published.)

As further incentive, we do pay a sizeable sum for *good* programs. All we ask is that each program comes on cassette, with a written introduction and an annotated listing. Please send all programming contributions to:

Gavin Monk, Your Spectrum, 14 Rathbone Place, London W1P 1DE.

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REVIEWS
Currah's MicroSpeech, general computing books, joysticks.
FEATURES
Speech synthesis, Toni Baker's machine code break-out, Spectrum communications, DIY keyboard buffer, machine code scrolling.
GAMES
Chess packages.



VOL 1/4 (JUNE 1984)
REVIEWS
Spectrum disk drives, QL roadtest, adventure programming books.
FEATURES
DIY joystick interface, synthesiser control, *ZIP* compiler [Pt. 2], colour simulation screen dumps.
GAMES
Hacker's review plus full map of *Jet Set Willy*.



VOL 1/5 (JULY 1984)
REVIEWS
British Micro's Grafpad, DIY computing books.
FEATURES
Computerised bulletin boards and modems, software for printer interfaces, *ZIP* compiler [Pt. 3], DIY joystick interface.
GAMES
Gilsoft's *The Quill*.



VOL 1/6 (AUGUST 1984)
REVIEWS
Spectrum toolkits, games programming books.
FEATURES
Hacking into *Jet Set Willy*, explosion routines, *ZIP* compiler [Pt. 4], files on Microdrive, DIY Centronics interface [Pt. 1].
GAMES
Ultimate's *Sabre Wulf*.



VOL 1/8 (OCTOBER 1984)
REVIEWS
Graphics toolkits, programming languages books.
FEATURES
Microdrive recovery, Project 3 revisited, multi-tasking your Spectrum, *YS MegaBasic* [Pt. 1].
GAMES
Vortex's *TLL*.



VOL 1/9 (NOVEMBER 1984)
REVIEWS
The Spectrum+ preview, Spectrum speech synthesisers.
FEATURES
Spectrum and QL link, *YS MegaBasic* [Pt. 2].
GAMES
Frank N Stein, Astronut, Monty Mole, Lords of Midnight, Sherlock, The Hobbit.



VOL 1/10 (DEC/JAN 1985)
REVIEWS
ZX Spectrum+ review.
FEATURES
Codebusters [Pt. 1], Interface ROMs, *YS Megabasic* [Pt. 3], M/C Sprite Designer.
GAMES
Deus Ex Machina, Hampstead, Peter Pan, Eureka.

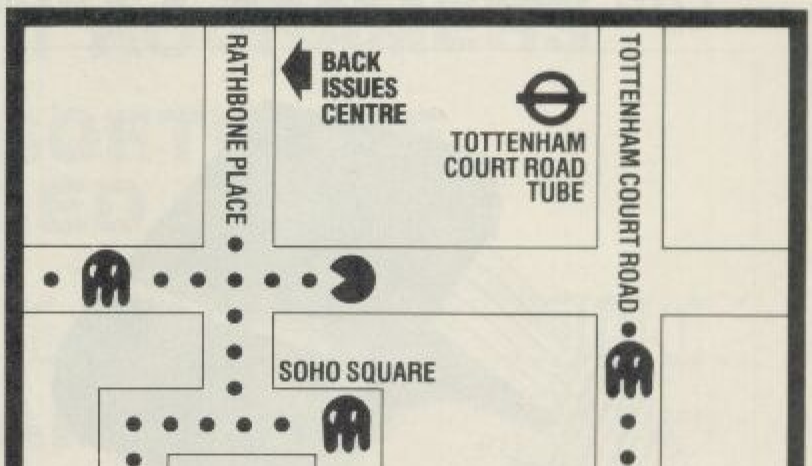


VOL 1/11 (FEBRUARY 1985)
REVIEWS
The Touchmaster.
FEATURES
Machine code commands, Spectrum pantograph, Codebusters [Pt. 2].
GAMES
Ultimate's *Underwurlde, Valkyrie 17, Tir Na Nog.*

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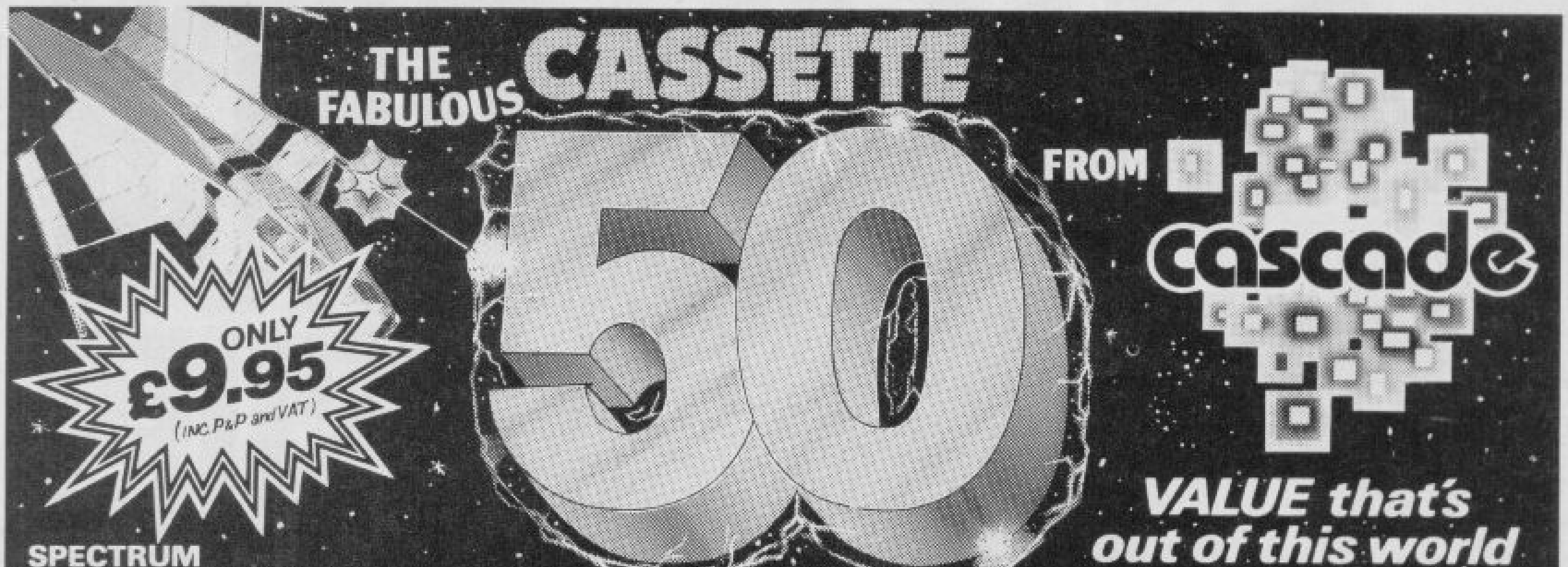
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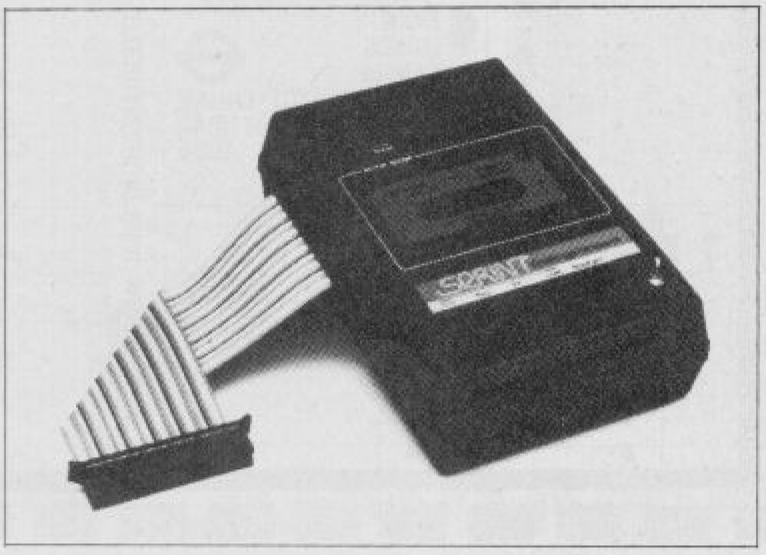
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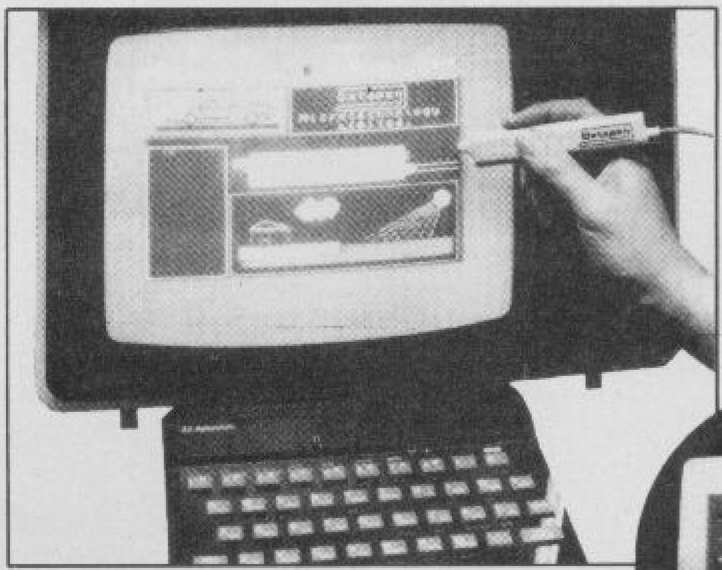
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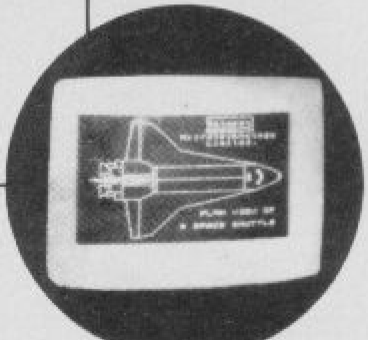
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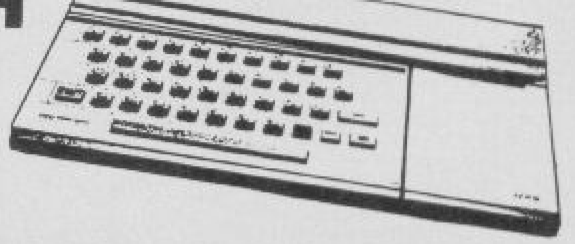
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■Original Spectrum software to swop. My list for yours. SAE please to Martin Crocker, 16 Derwent Road, Wyke Regis, Weymouth, Dorset. DT4 9DE.

■Swop *Combat Lynx, Braxx Bluff, Monty Mole* and *Moon Alert* for Video Command Joystick. Tel. 0326 290459 and ask for Sean.

■Swop *The Quill* and *Scrabble* (originals) for two of the following: *Android 2, Ant Attack, Tranz Am, Scuba Dive* (must also be originals). Tel. Dersingham 40497 for further details.

■Swop *White Lightning* for two out of *Daley's Decathlon, Delta Wing, Combat Lynx*. Also have many games. Reasonable offers accepted. Write to Mark Franklin, 69 The Heights, Northolt, Middx UB5 4BP.

■Software to swop. Send your list for mine. Tel. Northampton (0604) 403905, or write to Ryan Keates, 3 Bepton Court, Northampton NN3 3BQ.

■Would like to swop *Decathlon, Kong, Ant Attack, Zzoom, Penetrator, Tranz Am, Night Gunner* and *Froggy* for Dk'Tronics lightpen. Tel. 0334 74263 after 4pm and ask for Steven.

■Swop *QS Games Designer* for *Scope* or *White Lightning*. Tel. 05438 77852 and ask for Jon.

■I have *Space Raiders, Espionage Island, Bugaboo, Super-League, Chuckie Egg, River Rescue, Halls of the Things* and others. Will swop for any good arcade-type games. Tel. Glarryford 85479 and ask for Norman.

■Swop *Manic Miner, Valhalla* and many others for *Micro Olympics, Monty Mole, Pyjamarama* or any good software, or lightpen. Tel. 0484 607416 and ask for Paul.

■Swop *Moon Alert* and *Hobbit* for a powerful dissasembler, or someone willing to teach me machine code. Write to P Watson, 27 Miles Hill Crescent, Leeds LS7 2EU (age 15).

■I have software to swop. Many new titles, such as *UnderWurlde, KnightLore, Tir Na Nog*, and more. Tel. 01-552 3983 after 6pm and ask for Artar.

■Swop *Lords of Midnight, Alchemist, Sorcery, Survival, Make-a-Chip*, all originals, for *Strange Loop*. Write to Doug Bowman, Babingley Cross, Kings Lynn, Norfolk PE31 6AP.

■Swop *Decathlon, Micro Olympics, Crypt, Time Gate* and *Ground Attack* for *Scrabble* and *Android Two* (or offers). Tel. 0246 826264 and ask for John.

■Will swop *Sinclair Scrabble* for *Ant Attack*. Jason Liddle, 184 Diamedes Avenue, Stanwell, Staines, Middlesex TW19 7QP.

■Swop *Micro Olympics, Microbot, Skull, Bear Bovver, Alcatraz Harry, Yomp, Schizoids, Cookie*. Any two for *KnightLore*. Tel. Shaw 842 637 and ask for Lee Tudor.

■Swop Spectrum software. *Alien 8, Skool Daze, Sky Ranger, Eureka, Death Pit*. Write to JS Dickson, 142 Cumberland Road, London E13 8LR. Tel. 01-476 8884 after 7pm.

■Lots of software to swop. Games include *Avalon, TLL*, etc. Send your list for mine. Thierry Kumps, Langeweg 193, B-1900, Overijse, Belgium — anyone from any country!

■Will swop *Jet Set Willy, Atic Atac, Trashman, Splat, Halls of the Things, Moon Alert*. Send SAE. John Kerr, 'Edmonstoun', Martyn Street, Airdrie ML6 9AU.

■Will swop *Airliner + Whodunnit* for *Matchpoint* or *Pystron* or just *Airliner* for *Worse Things/Sea* or *Monty Mole*. Tel. 0525 373446 and ask for Robin.

■Spectrum software to swop. Send your list for mine. SAE please, or phone. Mr S Hayward, 29 Henwood Road, Compton, Wolverhampton, West Midlands, WV6 8PQ. Tel. 0902 753866.

■Swop games such as *Bugaboo, Doomsday Castle, Sabre Wulf* and many more. Tel. Kingsbridge 6201 and ask for Jo. Redford Court, Union Road, Kingsbridge, Devon TQ7 1EF.

■*Snowman, Fred, Bear Bovver, Tutankhamun, Jack & Beanstalk, Doomsday Castle, Birds & Bees*, (originals), for *Worse Things/Sea, Rapscallion, Blockbusters, Factory Breakout, Zombie Zombie, Adventure Quest*. Tel. 0385 881299 and ask for Chris.

■Will swop *Hobbit, Espionage Island* for *Lords of Midnight*. Tel. Newton-Le-Willows 28114 and ask for Joe.

■Swop *Hobbit, Jet Set Willy, Zaxxan* for *White Lightning*. Write to R Shah, 84 Spring Grove Crescent, Isleworth, Hounslow, Middlesex, London.

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■*Delta Wing, Decathlon, Matchpoint* or *TLL* wanted. Swop for any of my originals. Send SAE for full list to Simon Lack, 10 Denbigh Close, Banbury, Oxon. Tel. 0295 51279.

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■Help please! I need Issue 2 of *Your Spectrum*. £10 if in good condition and complete. Payment by cheque. Write to Pierpaolo Figini, 27041 Cascina San Re, Barbianello, Pavia, Italy.

■Microdrive with Interface 1 needed. Furthermore, has anyone out there got an OCP *Assembler* or m/c toolkit? Phone Eric on Portsmouth (0705) 370559.

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■Wanted. Circuit diagram for Jupiter Ace. Any reasonable price paid for even a photostat. Eddie Duncan-Dunlop, 1 Dan-Y-Lan, Aberkenfig, Nr Bridgend, Mid Glamorgan CF32 9AB.

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MESSAGES

■Prestel users, mailbox me for a chat! I am ten years old and like games. My name's Russell Hughes, but mailbox John Hughes directly. Sheffield Mailbox number 742361921.

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■ I am 12 years old and would like to have a pen pal the same age that likes writing programs and hacking. Write to Paul Pierce, 9 Marlcroft, Wem, Shrewsbury, Shropshire SY4 5AN.

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■Pen pal wanted to swop adventures, hints, tips, etc. I am 14 years old. Please include list of games. Euan Terras, 9 Leslie Terrace, Prestwick, Ayrshire, Scotland KA9 1LN.

■Pen pal wanted to exchange ideas, etc. I am adult, aged 33, and new to computing. ZX Spectrum owner. Alan Farmer, 18 Duncrub Drive, Bishopsbrigg, Glasgow G64 2EP.

■I am 15 years old, own a Spectrum and am a total games freak. Would like pen pals. Write to Toby Heiser, Foxhall, Grenfell Road, Maidenhead, Berkshire SL6 1HB.

■Owners of Technology Research DOS interface, write to me. I am 28 and want to swop hints and tips on converting programs to disk. Write to Per Henneberg Kirstensen, Norresobakken 111, 8800 Vibourg, Denmark. Tel. 009 44-661 2968.

■Penpal wanted to help me write my Basic programs. I am 15 years old and I am severely handicapped. I would like to swop games and ideas. Jonathon Payne, Wardens House, Anchor Court, Little Port, Ely, Cambs.

■Pen pal needed to swop software and hints and tips on Speccy programming and any other info. Paul Sadler, 55 Yewtree Road, Walton, Liverpool L9 1AJ.

■Pen pal wanted. I have a 48K Spectrum. I am interested in Basic, m/c and Forth programming. I am 16 years old and would like a pen pal of the same age (preferably in London). Alex Bermingham, 25 Murray Mews, London NW1 9RH. YS

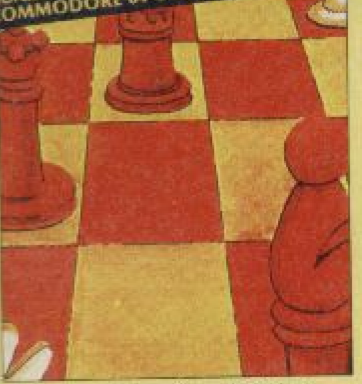
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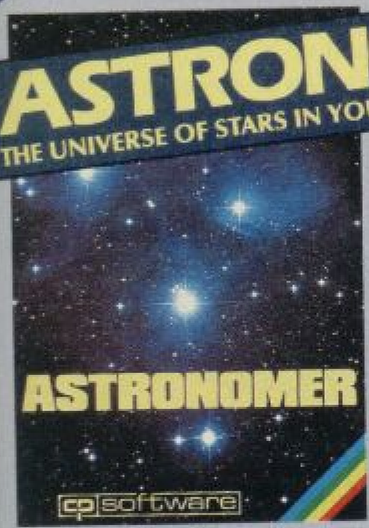
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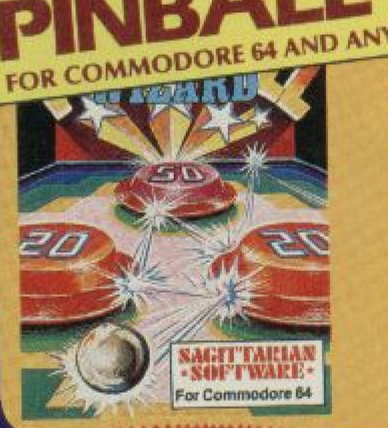
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JET-SET JOEY!

Getting a foothold into the 'glamorous' world of writing software can be a harrowing experience. Sue Denham calls on Joey, ex-programmer for Bug-Byte, to recall the tortuous road to success.

You don't have to keep your ear too near to the ground to hear reports of teenage software authors earning the kind of money you'd normally associate with the likes of *Dallas*! But that doesn't mean the rumours are entirely true. Although the incentives may seem the same as those offered to rising stars in the pop music world, in reality, success in the software world is difficult to attain.

Joey, a former student at Manchester University studying computer science in the late '70s, got his first big break writing a Spectrum program for an LP called *XL1* by Pete Shelley (ex-frontman for the punk band, *The Buzzcocks*).



TONY SLEEP

"I'd never really seen a home computer before I went round Pete's house and had a go on his Spectrum. We never did anything particularly exciting with it — just played games and so on — until one evening we hit upon the idea of writing a program that would flash the lyrics of a song up on-screen in time with a record. In a mad fit of enthusiasm I wrote a small program in Basic to prove it could be done and then, once it looked like Pete would put the program on his LP, I spent three months learning Z80 machine code."

Had you by this time decided to be a professional software writer?

"Well, yes, but it didn't quite turn out to be the way I imagined it. Around July '83, when *XL1* was finally released, I was still working for Manchester Council, re-arranging the software governing rates payments and various re-housing projects. I was very excited about the release of *XL1* — I thought there'd be all sorts of people after me to write programs for their albums; you know the sort of thing, long-distance 'phone calls from *ABBA* and so on. Of course, nothing happened at all — it was very disappointing.

"When I saw that there was absolutely no recognition coming my way as a result of *XL1*, I went to see Tony Wilson of *Factory Records* — a company that's guaranteed to experiment with new ideas. I told him about a 'sound of light' program I'd been working on and, lucky for me and my depleted wallet, he was impressed enough to buy me my own Spectrum — which at the time was a godsend!

"I also nearly got to record a program on a live album with Elvis Costello. He'd recorded a couple of gigs at 'The Hacienda' in Manchester and was very interested in including a Spectrum program as one of the tracks — hardly surprising since Elvis was a computer operator before he became a successful musician. Anyway, to cut a long story short, that project fell through as well ... although it was a good connection to make."

How did all these near misses to fame and fortune affect your work for Manchester Council?

"Well, by late '83 I realised there was no way anyone was coming searching me out — so I went after them. I answered an ad in *The Guardian* to join Bug-Byte as one of its programming team. The first interview comprised of a quick chat and a small machine code test — nothing too difficult, but it certainly weeded the candidates out. The second set of interviews were a lot fiercer — four of us were competing for just two jobs! The head programmer devised an exam for us, testing a lot of the theory I had learned at college. Nerve-wracking stuff — but I managed to get myself a job!

"It may not seem much but during the year I was at Bug-Byte I was involved with the production of *Twin Kingdom Valley*, *Star Trader* and *Automan*. We'd also have to examine tapes sent in by outside programmers — about six a day — but it didn't take very long ... they weren't usually very good."

You seem to have been very involved with the Spectrum so far in your career — how do you view the CBM 64 as a rival micro?

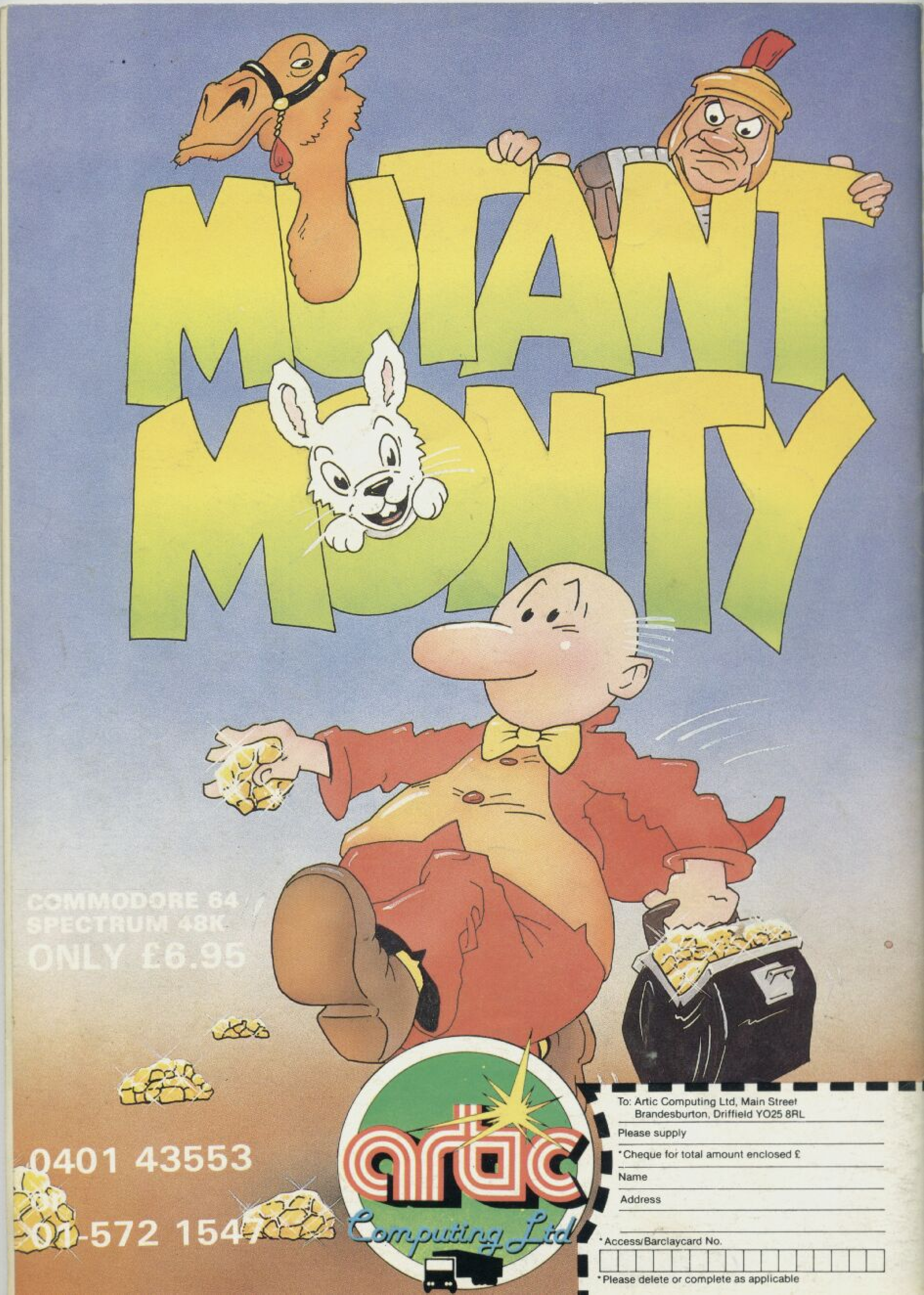
"As a matter of fact, my latest project is for Island Logic, converting the Beeb's *Micro Writer* for the '64. At the moment, the Spectrum seems to have lost the number one position — but everything gets converted for everything else anyway!"

What advice would you give to anyone contemplating a career in software?

"Well, first off, you need a lot of ideas, backed up with a lot of confidence. But, most of all, my best advice is not to listen to anyone else's advice ... don't be afraid to experiment with your Spectrum and work out problems for yourself. And, lastly, don't believe too much of that rubbish you read about the 'glamour' of writing software. In my time, I've only *nearly* been interviewed by Channel 4, I've *never* been invited to a computer show and as for that Porsche ..." YS

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